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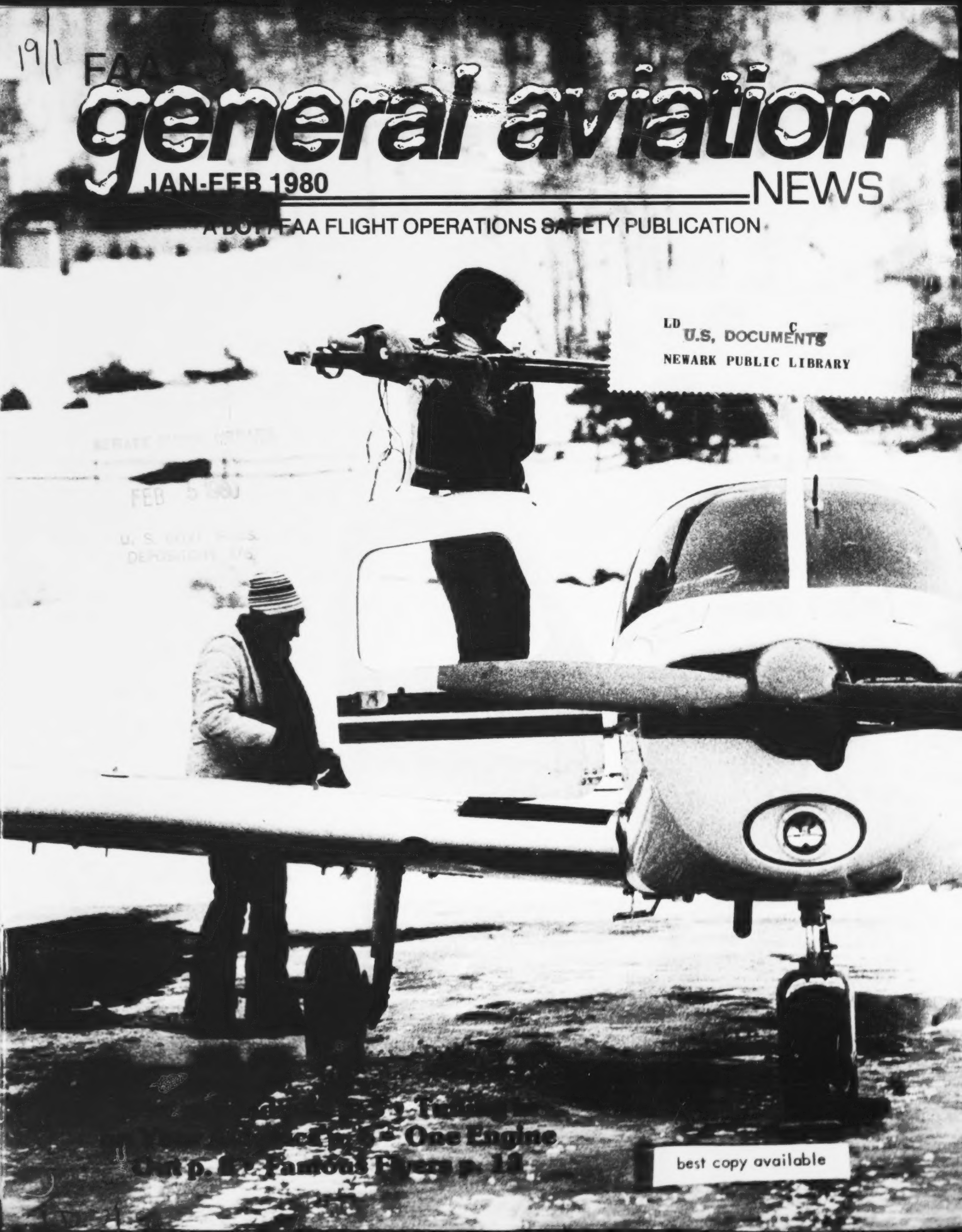

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FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION

JANUARY-FEBRUARY 1980
Volume 19, Number 1

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BRIEFS

AVOIDING EXPERIMENTAL RADAR. A hazard zone for aircraft carrying electro-explosives or using high frequency exists in Somerset County, Me., where the U.S. Air Force is testing an experimental radar. The tests, which will continue until June of 1981, are on an intermittent basis 40 hours a week. Check Graphic Notices and Supplemental Data for specific location and avoidance altitudes.

CHOPPED BAGGAGE. A recent light twin accident was caused by a nose baggage door popping open in flight, causing loss of control, a crash, and loss of life to all on board. Investigation revealed that excess play between the door key mechanism and the latch lever allowed the door to close and appear locked after the key latch was already in the locked position, preventing complete door closure. Some 525 malfunction reports in the past 24 months indicate this is a potential problem in all aircraft, which can usually be prevented by regular inspection and strict adherence to rigging and adjustment instructions.

VACUUM PUMP PRECAUTIONS. Incorrect engine cleaning procedures can introduce harmful solvents to the dry air vacuum pumps that power some light aircraft instruments. Unless the vacuum pump is covered during cleaning, the seal, carbon bearing, vanes, and rotor in the pump could be damaged, causing premature pump failure with little or no warning. Failure of the vacuum pump means loss of the attitude gyro, directional gyro, and turn-and-bank indicator. Bound to be a challenge aloft.

BURIED ALIVE. During a routine 100-hour airplane inspection, an ELT battery was tested, found to be without vital signs, and discarded in a hangar trash can. The next day someone spotted smoke in the hangar and discovered fire smoldering among oily rags in the waste can. An empty metal drink container had shorted the apparently dead battery's terminals, causing overheating and a potential conflagration of some pretty expensive airplanes. Batteries of any kind should be discarded in a special plastic container kept free of metal objects that can short even a partially discharged battery.

NEW PART 125. Deadline for comments on this proposed rule change, which would make aircraft size the criteron for determining safety standards, is February 19, 1980. See Nov./Dec. issue for details.

Winter Landings

Controlling the Airplane on a Slippery Surface

Nothing spoils a winter vacation or business trip in your own airplane as completely as a landing mishap at the final destination. You carry out a long, well-planned and well-executed flight in a thoroughly professional manner, impressing friends and family, only to wind up in some ridiculous position with your tail in the air and the ceiling where the floor ought to be. Even if no one is hurt, your pride is pricked and your wallet is bound to suffer.

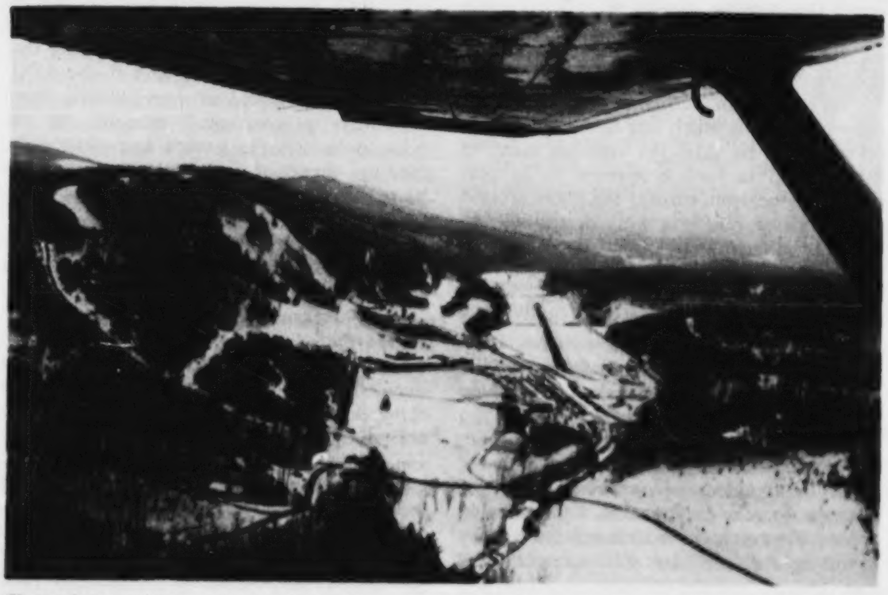
Landing accidents tend to increase in the winter, especially in the north or in mountainous areas, whenever the temperature drops down below freezing. The chill factor in landings is something that many pilots ignore when planning winter flights, especially if the weather at their home airport is on the balmy side. If they encounter ice or snow on touchdown they could find the airplane suddenly developing an apparent will of its own as to where this particular trip is going to end.

Putting a ton or more of airplane down on snow or ice, without losing directional control, is no simple matter, even in the absence of crosswind problems. To do it safely you have to develop a sensitive toe for braking plus quick and accurate responses on *all* the flight controls—not merely the rudder. A light plane skittering over glare ice is as much a challenge to control as any condition you are likely to find in general aviation flying. Meeting it successfully takes understanding, training, and recurrent practice. It does not come naturally.

During the five winter months of 1977 (November through March) there were 103 landing accidents on snow or icy conditions according to reports of the National Transportation Safety Board. The majority of these accidents were a direct result of the pilot's inability to maintain directional control of the airplane during the landing roll. Equipment failure was rarely involved, although it sometimes seemed so to the pilot. Typically the pilot found his airplane drifting off the centerline on roll-out and attempted to retain control with the use of brakes and rudder only. Examples:

- **Billings, Mont.** A 700-hour pilot with a commercial certificate attempted to land at a nearby ranch strip, on a near-zero temperature day in December. He had flown into this strip on at least 40 previous occasions within the past 90 days without mishap. But on this wintry day the wind was blowing at 20 knots, gusting to 30, from 270°, and there was ice and slush on the ground. The *Cessna 206* was blown off icy Runway 33 to the right, where it collided with a rock fence, causing considerable damage to the landing gear; fortunately no injuries.
- **Van Wert, Ohio.** The pilot of a *Grumman American* had no crosswind problems as he approached the airport with the westerly wind blowing right down the runway at his nose. But it was evening and there were patches of ice on the pavement. After touchdown the airplane began to turn toward the left. The pilot applied full right rudder and brake, without effect. He then applied full power for an attempted go-around, but before he could rotate the airplane struck a snowbank and turned over. Minor injuries, substantial damage.
- **Martinsburg, Pa.** During the landing roll the *Cherokee* veered to the left across the snow-covered runway. The student pilot applied full opposite rudder, but the left gear smashed into a block of frozen snow, snapping off. The wind was reported as nine knots at 290°, ten degrees to the right of the runway. Substantial damage, no injuries.

The preparation for landing on snow with wheels is similar to landing on wet or muddy fields. Touchdown should be made at the lowest possible airspeed, with a nose-high attitude maintained by power as required. Braking effect may be nil and probably should be avoided altogether until the airplane slows down, since the surface is unpredictable and a sudden catching of the brakes on a bare patch of surface could throw too much pressure on the nose wheel,



Flying into a ski resort airport may be your first experience with icy pavement and contrary winds. Advance preparation will help avoid leaving a sitzmark off the runway.

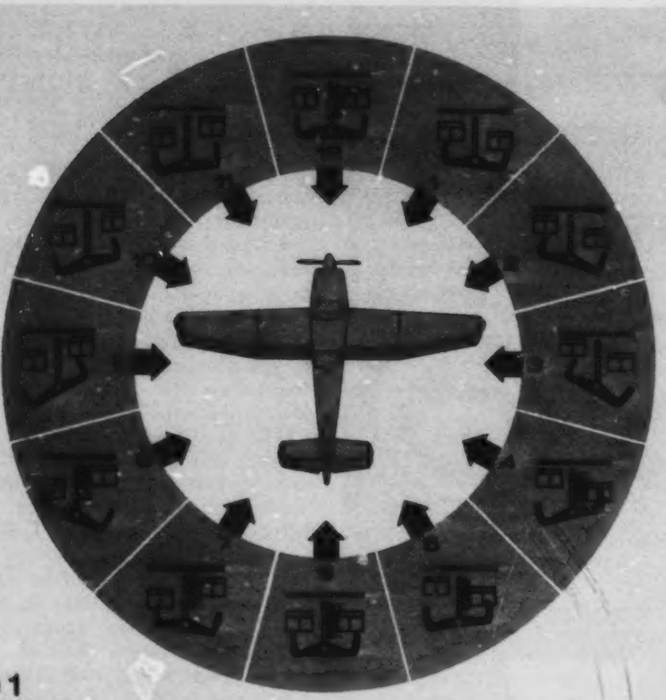


Figure 1
Control settings for ground run under varying conditions. Large arrows show wind direction.

or pull the plane to one side. Every effort should be made to line up with the centerline before touchdown.

Even at low speeds, braking action on slippery runways requires a very sensitive touch to avoid initiating a skid, and in some conditions any braking or nose-wheel steering, may be non-effective. Rudder action always gives some control, but whenever the wind (including the airflow component from the moving airplane) is more than nine knots, rudder should be used in conjunction with ***aileron*** and ***elevator,*** **when taxiing as well as rolling on the runway.**

Controlling an airplane on an icy or snowy surface is much like handling a plane on water or on skis: the controls must be manipulated in such a manner as to prevent the wind from turning the plane around on its axis or raising a wing or the tail. In general the technique consists of raising the upwind aileron, together with opposite rudder and back pressure on the wheel—whenever the wind component is in a forward quadrant. This prevents the wind from lightening wheel pressure on the upwind side and from pushing the tail around or up in the air. (See diagram).

With a quartering wind, the upwind aileron is deflected down to avoid raising the wing; the rudder is coordinated and the elevator depressed. Note that with the wind abeam, the controls are manipulated as they would be with a headwind component, since the forward motion of the airplane will produce this effect. The pilot must be alert to sudden wind shifts, and remember to adjust controls appropriately after turning onto or off a taxiway.

Apart from insufficient skill, the main type of pilot error involved with icy runway landings appears to be lack of preparation. Many of the winter accidents were due to the pilot's dearth of knowledge of landing conditions at his destination airport. Often the pilot had decided to save himself the expense of a telephone to an uncontrolled airport, expecting to be able to assess field conditions from the air. But snow depth and consistency is not all that perceptible from the air, and if the UNICOM is unattended or non-existent, there is always psychological pressure on the pilot to belittle the hazard and chance the landing. Some of the unpleasant surprises he is likely to encounter are:

- **Too much snow.** The pilot of a *Luscombe 8A* made two low passes over the small private airport near Slippery Rock, Pa., to examine the snow depth. He observed that the snow was barely up to the wheel hubs of several parked aircraft, and decided that indicated a tolerable two to three inches on the runway. There was no active UNICOM to confirm his estimate. He made a careful, straight-in approach, touched down into more than a foot of heavy snow and flipped over before traveling 100 feet. Minor injuries, heavy damage. The pilot admitted later that if he had telephoned the airport earlier or examined the snowcover more cautiously he would not have chanced the landing.

- **Hard crust.** A business flight in a *Cessna 150* also ended in a nose-over near Glasgow, Montana. The pilot, who had obtained no advance information regarding runway conditions at a ranch strip, could see that the snow on the frozen turf was not more than three or four inches deep; but what he did not suspect was the presence of a heavy crust over light snow, as a result of day-time thawing in the December sunshine and night freezing. His light plane stayed on top of the snow for several hundred feet after landing, then the nose wheel broke through the crust and over he went. *No injuries but no profits on this trip, after a hefty repair bill.*

- **Locked wheels.** A brand new *Cessna 172* aged very fast on a February day in Ohio, following a crash landing at Urbana Airport with an inadvertent braking application to one wheel. The pilot had not thought to remove the wheel fairings before departing from a slushy airport. By the time he was ready to land, the slush had frozen around the left wheel to the extent that it would not turn. The airplane skidded off the runway and come to rest inverted in deep snow.

- **Underinflated struts.** The pilot of a *Cherokee,* taking off from a snow-covered airport near Pontiac, Michigan, did not notice, in his admittedly brief preflight check (the temperature was about 20°F), that the right wheel strut was not normally extended. When he returned to land, the airplane swerved to the right shortly after touchdown and crashed into a snowbank—fortunately it was only partially frozen. *Expensive repairs; injury to pride only.*

- **Downhill runway.** There was only a thin, icy glaze on the runway when the pilot set his *Tripacer* down on the small airport near Coeur D'Alene, Idaho. He touched down on the numbers and rolled out smoothly along the centerline. However, the airplane did not appear to slow down appreciably as he applied brakes, and he was unable to prevent an overshoot into a stand of pines. He was unaware, until it was pointed out to him by the investigating inspector, that the runway had a four-degree downslope in the direction he had landed—under virtual no-wind conditions. In a contest between brake friction on ice and gravity, gravity usually wins. Determining the slope of a runway from the air in snowy terrain is just about impossible, particularly in the mountainous areas surrounding ski resorts.

Accidents of this kind are often not taken seriously because the injury rate is low, but the potential for tragedy is always there. And in any case they are the quickest way to spoil what starts out as the perfect holiday. The tendency to regard skidding on ice as "unavoidable" is a mistake. Like ice skating, all it takes is professional instruction, plus determined practice. The technique is known. ☐

Is there anything more exasperating than investing in a bundle in first-rate avionics equipment, including transponder and ADF, in the interest of flying safely in all kinds of weather and through all kinds of traffic jungles, only to find that the new equipment brings new or worse problems? *Interference, fade-out, intermittent or weak signals, messages from outer space,* etc. You have the units pulled and bench-tested and checked out in the airplane and on the ground; no problem surfaces until you are aloft in some situation where you really need the radios. Are the manufacturers and mechanics in league against you, or are there gremlins in avionics?

If you think it is gremlins, one good place where the pilot or owner can start looking for them is *outside* the cabin, in the antennas. Broken, bent, loosened, or otherwise weakened antennas have probably caused more problems with radio communication than the transceivers themselves—mainly because they are externally mounted and vulnerable to damage from the environment and from people.

It is difficult to believe that a few cents worth of bent wire can disrupt the functioning of thousands of dollars worth of avionics, but nevertheless, it does happen. Just how antennas work, how they propagate radio waves across hundreds of miles of airspace is something we are unable to explain in simple language. But certain facts about the behavior of antennas are known and should be understood by pilots:

1. Optimum performance for a radio is very unlikely unless the antenna is correctly designed and properly mounted.

2. Antenna function is easily degraded by corrosion at the mounting, loose fastenings leading to vibration, slight bending out of shape, and even unsuitable paint.

In other words, before you spend a lot of money on new or better avionics, why not try to see how much you can improve the performance of your present equipment by checking over the antennas carefully? You might be very agreeably surprised at the results, and in any case you will have acquainted yourself with a pilot maintenance aspect of aircraft inspection that is much overlooked.

The first time around you might want to have a certificated mechanic at your side, partly to make sure you do not undertake any maintenance you are not allowed to do, but also to help you identify the different antennas. A modern aircraft may have nearly a dozen visible antennas. *Why so many?* Ideally there is a given antenna length for each radio frequency that we may use. In common practice this optimal performance is located at the center of a desired range of frequencies, but this range is limited and reception weakens rapidly as you approach the limits. The higher the *frequency* of the radio signal, the shorter the antenna *length.*

Most modern aviation communications and navigation radios operate in the very high frequency (VHF), which permits a shorter antenna, reduces drag, and simplifies installation. VHF frequencies are also less susceptible to atmospheric static. Their primary drawback is that their propagation is limited to line of sight, and is cut off by terrain obstacles or the curvature of the earth at a moderate distance.

The basic communication radio is connected to a short vertical wire whip mounted on top of the forward cabin. The lower portion of this wire may be bent aft at an angle or be in the shape of a "V" in which case the antenna is also serving one or more navigation radios. In general aviation communications radios primarily are designed to transmit and receive *vertically polarized* signals while many navigation signals are horizontally polarized.

If you have dual communications and navigations radios, your best results will be obtained with separate antennas mounted in opposing positions on the fuselage. This isolation will minimize antenna interference. When they are co-located, even if operating on different frequencies, there is the possibility of one receiver picking up part of a strong signal from a different frequency in certain conditions of flight. In some cases, a sensitive receiver, is more likely to pick up stray signals from nearby antennas. Normally, *but not always,* these factors are

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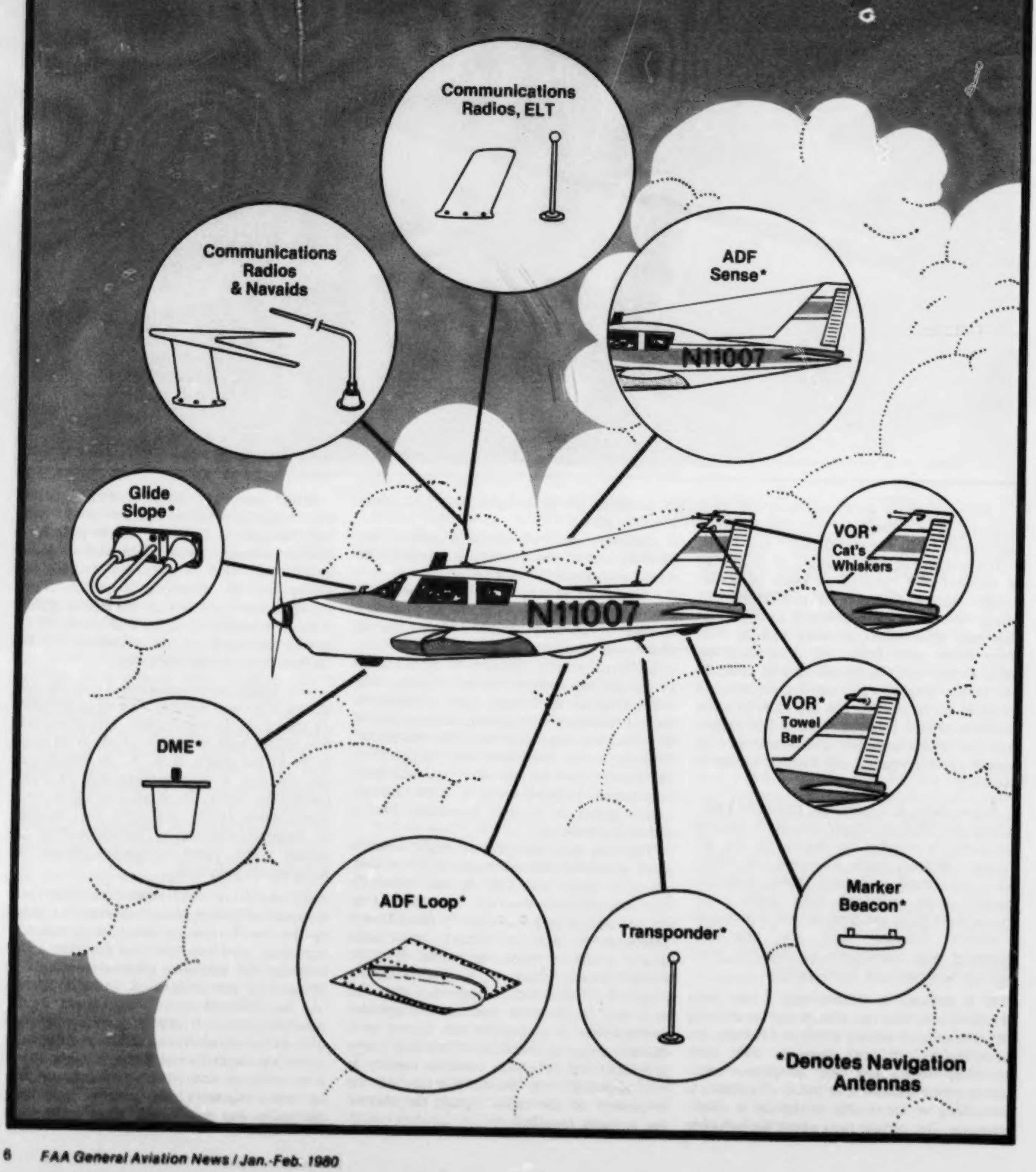
TYPICAL ANTENNA SHAPES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ADF Loop*
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Marker
Beacon*
*Denotes Navigation
Antennas

Typical topside installations. New designs (inset) combine the communications antenna with ADF loop and sense.

taken into consideration during the installation of the radios.

The efficiency of your radio at any given frequency can be measured by your mechanic with an instrument which determines the Standing Wave Ratio—the ratio between the power output at the transmitter and the antenna. The higher the ratio, the greater the power loss; a 2.0:1 ratio is satisfactory; any larger ratio would be poor. If your readings are bad, there could be problems with the antenna or the connecting cable; if the readings are good, before you consider better radio equipment, check with your aircraft manufacturer as to the suitability of your antenna range. Optimum positioning of antennas differs very significantly from one make and model of airplane to another for reasons that are not fully understood. Space age electronics has also introduced corrosion free, longer lasting antenna materials now available for general aviation radios.

Streamlined fiberglass housings are now used on many antennas to protect them from dirt and ice accumulations, which can interfere with their function by setting up undesirable vibrations in flight.

The DME, ADF loop, transponder, and marker beacon antennas are frequently placed on the underside of the aircraft; the glide slope antenna is on the nose (or on the inside of the windshield). The VOR antennas are either on top of the cabin or on the vertical fin. The long wire still seen on some airplanes extending from the cabin roof to the top of the vertical fin is the older type of ADF sensing antenna; more modern versions position them inside the loop housing.

The exposed wire or metal rod type of antenna is the most susceptible to weathering and mechanical damage. Check to make sure it has not been bent out of shape or has a piece broken off, and make sure that the mounting is secure and shows no sign of corrosion. If you started having radio troubles after flying near some heavy thunderstorms, you may have taken a lightning strike, so look for indications of burning or disfiguring. Make sure the airframe area around the mount is still firm and retains its shape.

Fiberglas housing should be examined for cracks that would let in moisture, dents that could cause vibration, and the security of the mounting itself. Belly-mounted antennas are most susceptible to damage from hard landings, off airport landings, or flying debris from run up. They also tend to become caked with mud or frozen slush, which could distort their signal if the foreign material contained certain metallic substances. Even coating them with the wrong kind of paint (with a metallic base) would have this effect.

After you have made a careful visual inspection of your antennas and are on a first-name basis with them, make a ground check of your radios with the master switch on and ignition, generators, cabin and navigation lights, etc., *off*. A loose connection in any of these electrical systems could be giving you a problem.

Finally, put in a call to the tower or UNICOM and ask for a radio check. If you are still bothered with static, whining, buzzing, or squealing noises from your receiver or with needle deviation or limited range in flight, ask your mechanic to inspect the cables that connect your antennas to your radios. Sometimes the cables are bundled close to electrical wires or other cables without proper shielding. Or occasionally the antenna cable becomes distorted from the effects of a nearby heat source.

Only when you are perfectly satisfied that the whole antenna system is healthy are you on sure ground in pointing an accusing finger at the radios. Chances are that if you keep the gremlins away from your airframe the black boxes will do a pretty good job. There's hardly room inside them for mischief-making. □

(Technical Advisers, Eugene Sherman, Airworthiness Standards and James Coyle, Communications Specialist, NAFEC. Graphic material from "Every Pilot's Guide to Aviation Electronics," by J. M. Ferrara, 1976, EL-JAC Publishing Corp.)

One Engine Out

A Close Look at Single Engine Performance in Twins

The official investigation statement was brief and grim: "At the airport the night sky was dark but clear and the visibility was about 5 miles. After takeoff the aircraft climbed to an altitude of between 0 to 100 feet above the runway, where the left engine failed. The aircraft turned to the left, descended abruptly into a field, exploded, and burned. All occupants—the pilot and five passengers—died in the crash."

The National Transportation Safety Board determined that the probable cause of this accident, which took place at Chillicothe, Mo., was engine failure at a point where ". . . the airplane's single-engine performance in the takeoff configuration and its height above the ground combined to make the pilot's ability to sustain flight marginal."

Statements of this kind appear to question the popular assumption that when it comes to flight safety two engines are always better than one. There is, unfortunately, not enough data available to settle the issue of whether pilots of equal ability and experience are less likely to have an accident related to engine failure in a twin, or in a single-engine aircraft.

We know that there are about 800 accidents each year (in recent times) following power loss in single-engine airplanes; and only about 48 accidents per year following loss of engine in twins. But no useful conclusions can be drawn from these figures, regarding the safety margin provided by the second engine on an airplane because we have no reliable data on the respective hours of usage—or on the engine failures that do not result in an accident.

One important point that appears beyond dispute is that pilots who have never experienced engine failure in a twin under critical conditions are apt to over-estimate the degree of flight control that would remain available to them after such a power failure. Many pilots would find it hard to believe that in some circumstances light twins, after losing power in one engine, are capable only of *a controlled descent*. Such lack of understanding lies behind the high rate of fatalities in accidents following power loss. About *one out of every three* of the 146 engine-out accidents in twins reported during a recent three year period, 1975-77, were fatal.

What about the Federal Aviation Regulations? Do they not require multi-engine airplanes to be able to climb on one engine? That depends on the airplane weight, engine, altitude, temperature, category of certification, and performance ratings. Airplanes certificated in the transport (over 12,500 lbs.) category, for example, and turbine powered twins are required to operate at weights which permit maintaining specified climb gradients. Airplanes weighing between 6,000 and 12,000 lbs.) with two reciprocating engines—which includes a great many general aviation twins—must be able to maintain a steady rate of climb at 5,000 feet under the following conditions:

1. Inoperative engine feathered.
2. Remaining engine at not more than continuous maximum power.
3. Landing gear retracted.
4. Wing flaps in the most favorable position.
5. Cowl flaps as described in the flight manual.

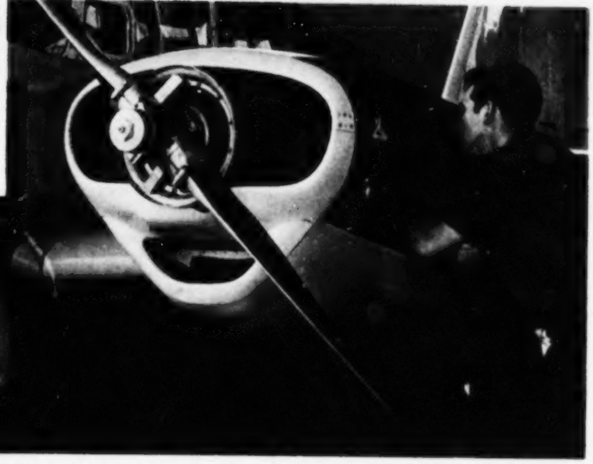
If the airplane weighs 6,000 lbs. or less, and has a stalling speed, with flaps and gear extended, of 61 knots or less, certification requires only that "the steady rate of climb at 5,000′" be *determined* (under the above conditions). There is *no* minimum climb rate.

Generally, the performance charts of light twins certificated in this category show single-engine climb capability up to 5,000′, in the clean configuration, in the range of 200-300 fpm. (See Fig. 3.) But remember, these performances were recorded with a factory-fresh airplane—flown by a highly skilled test pilot flying precisely at the best rate of climb speed under ideal weather conditions. Although 200 to 300 fpm may sound like a good climb rate for one engine, consider some of the factors that can erode that apparent safety margin:

- **Landing Gear.** If one engine fails while the landing gear is still extended, the potential single engine climb rate would be reduced by approximately 200 fpm. In some aircraft the act of gear retraction (opening of wheel well doors) causes a temporary additional *increase* in drag, which could be critical at minimal airspeeds.
- **Flaps.** If the wing flaps are not retracted to optimum position for climb, as much as 75 to 100 fpm of climb rate could be lost for each 10 degrees of deflection. If the cowl flaps on the dead engine are not closed after power failure, an additional 25 to 50 fpm could be lost from the climb rate.

Extended landing wheel is mute evidence why this light twin, following engine failure after takeoff, was unable to maintain altitude. →

The effect of a maximum load of passengers and/or cargo on the single engine performance of a light twin must be considered by the pilot.



Good engine maintenance assures optimum single engine performance. NTSB records indicate the likelihood of fatalities in engine-out accidents is four times greater in light twins than in single-engine aircraft.

- **Propeller drag.** A windmilling propeller can cut the potential climb rate by 100 to 200 fpm. Like all aerodynamic drag it increases as the square of the velocity increases. On the other hand, an overhasty feathering of the wrong propeller leads to zero thrust, and a very rapid descent. As ridiculous as it may sound, this is a common cause of accidents. The failed engine must be identified by control response and verified by throttle reduction before it can be feathered safely. The harried pilot who has an engine failure at a critically low altitude could easily feather the wrong engine or forget the feathering step completely unless he practices engine-out emergencies often and is mentally prepared at all times.
- **Flight control.** The optimum climb performance speed with one engine out is possible only if the yaw and roll condition brought about by the inoperative engine is countered with the most effective use of rudder and aileron. Optimum performance with one engine out is achieved, in most light twins, with a 3° to 5° bank toward the good engine and appropriate rudder pressure to maintain heading. An imprecise procedure will increase the drag and reduce the climb rate. Furthermore, any deviation from best single engine rate of climb airspeed (either above it or below it) will result in a diminished climb rate.
- **Altitude.** A significant reduction in climb capability must be expected if the engine loss occurs at a density altitude in excess of 5,000′. The manufacturer's performance chart for one typical light twin at maximum gross shows a single engine climb rate of 350 fpm at sea level and standard temperature, which is cut down to 150 fpm at 5,000′ and down to 75 fpm at 7,000′.
- **Weight and balance.** Weight is a direct factor in climb performance. A typical light twin at a maximum gross weight of 5,000 lbs will have only about 50 percent of the single-engine climb rate it has at 4,000 lbs. Excess weight will reduce the climb rate proportionally and forward C.G. climb also degrade performance.
- **Power.** An airplane with engines that have gone a long time between overhauls and are not delivering fully rated horsepower is not going to climb according to the book, when one engine quits. Low compression or weak ignition may be overlooked when both engines are functioning, but any lack of maintenance will be very evident when the airplane tries to climb on one engine. Some pilots assume that because they have two engines they can afford to be a little more casual about maintenance—a very unrealistic assumption. An inoperative engine is a very burdensome performance handicap to carry.
- **Airframe.** Usage likewise tends to slow an airplane by marring the streamline condition of the fuselage and wings. Misfitting doors and hatches, popped rivets, small dents or disfigurations, even chipped or rough paint, all contribute to an increased wind resistance and reduce the margin of safety for single engine performance in a light twin. Structural icing, of course, can be even more destructive of normal airflow.
- **Environment.** If an engine quits after dark or when visibility is restricted by weather, chances are that pilot performance will be affected—especially with only a one-man crew. The pilot has to maintain control of the airplane while going through all the steps in his emergency procedure and this may take longer in the dark or in clouds. At airports he may have trouble seeing obstacles to flight and at altitude he may have no visible reference to the ground or the horizon. In a real-life situation the pilot may not make any *big* mistakes, but his margin of error could be too slim for even small mistakes.

Turbulence, incidentally, is another little recognized environmental factor which degrades potential climb rate with one engine out, and increases control problems. The reported or possible presence of *windshear* should be regarded as particularly hazardous.

The fatal accident mentioned at the beginning of this article, which took place on takeoff at 9:16 p.m., at Chillicothe Municipal Airport in Missouri, is a typical example of the pressures brought to bear on the pilot when he experiences an engine failure in the dark. According to the NTSB investigation, the aircraft was between 50 and 100 feet above the runway when the left engine failed (because of a broken crankshaft). The light twin, a Beech *Baron 58*, was capable of climbing about 300 fpm at the runway altitude with one engine out, its propeller feathered, flaps and landing gear retracted.

Piper Navajo

According to one witness, the airplane climbed to an altitude of between 100 and 150 feet, before stalling and plunging to the ground. Flaps were retracted but not the landing gear—which would have degraded the twin's single engine climb performance by about 200 fpm. The Safety Board concluded that "since the pilot did not perform the first item on the engine failure procedure (retracting the gear), he did not manually feather the propeller, which windmilled for an indeterminate period before going into an autofeather position." The windmilling prop would have cost the airplane (approximately) 200 fpm in potential climb rate—resulting in a rate of descent of about 100 fpm at the full gross weight of the airplane. Although the pilot was properly certificated and experienced, the Board found that his ". . . ability to maintain flight after the engine failed was marginal because of nighttime conditions, the aircraft's low altitude, and the aircraft's inability to climb or maintain level flight in the takeoff configuration with one engine inoperative and its propeller windmilling."

Another fatal accident to a light twin that took place after nightfall, in Australia as it happened, is significant because of the manner in which the Australian Department of Transport arrived at the probable cause. The pilot, also very experienced, had taken off from Runway 34 at Melbourne Airport shortly after midnight, alone on a cargo run in a Piper *Navajo Chieftain*. Using an intersection departure, he had climbed the airplane to a height of from 100 to 200 feet above the ground when he reported a fire in his right engine. He asked for and received permission to land on Runway 27, commenced a shallow right turn toward the runway, but descended and struck the ground before completing the turn.

Examination of the wreckage disclosed that landing gear and flaps were fully retracted, and the right propeller had been feathered. The *Chieftain's* operating manual indicated that the airplane should have been able to maintain a climb rate of 220 fpm at maximum gross weight for the given conditions of departure.

However, the *Chieftain* had been slightly overloaded, in excess of 143 lbs., which investigators calculated to have cost the airplane *25 fpm* in single-engine climb rate. Another *40 fpm* was believed to have been lost because of the bank angle of the turn, estimated as having been 15 degrees away from the live engine. The airplane had logged about 3,400 hours of use, resulting in a "normal" deterioration of the airframe streamlining which investigators believed reduced the potential climb rate by *100 fpm*. Finally, the turbocharger of the left engine was found to have been incorrectly adjusted, to the extent that the remaining engine could develop only about 300 brake horsepower, instead of the rated 350 BHP. Investigators believed this reduced the climb rate with one engine by another *75 fpm*.

The total estimated reduction in climb rate was 240 fpm, which could explain why the pilot was unable to prevent the premature descent, despite having a clean configuration.

Postcrash investigation of this accident also revealed that the apparent fire in one engine was actually an oil leakage dripping on the hot exhaust pipe. Under daylight conditions the pilot might have observed that it was possible to control the problem with reduced power, instead of shutting down the engine completely before reaching a safe maneuvering speed or altitude.

Given the multitude of factors which could lead to loss of control in a light twin after an engine failure, it is apparent that pilots of these airplanes are in no position to relax their vigilance in the cockpit simply because they have more than one powerplant. From one point of view, two engines make it more unlikely that you will find yourself without power in flight; but from another view point two engines means *a greater likelihood of an engine failure*. Losing one out of two engines in flight gives you more options than power loss in a single engine, airplane to be sure, but this also means more opportunities to make a mistake. Losing an engine cuts your power in half, but reduces your climb capability by 80 to 90% of all engine climb. This is due to the high drag condition resulting from the inoperative engine and consequent control deflections.

Are certain types of pilots unable to handle this kind of emergency? A survey of 146 pilots involved in twin accidents following failure of one engine, during the period 1975-1977, does not lead to any specific profile. The pilots' ages varied from 20 to 69; experience ranged from 416 hours to 25,000; and time in type from three hours to 790.

Most of the pilots held commercial or ATP certificates. Airplane usage was divided fairly evenly between pleasure, business flying, and commercial operations.

One surprising statistic is that during this three year period 94 of the 146 accidents followed an engine failure *at altitude* (in cruise or descending), as opposed to 52 that followed engine failure on takeoff/climbout. It is obvious that sudden power loss during the takeoff procedure can be critical; but it is less apparent why the pilot who is in a position to trade off altitude for airspeed should be unable to maintain control and complete a safe landing. In most of these cases the pilot was not able to position the aircraft properly on final approach and either landed short, over-ran the runway, or stalled during a go-around or turn.

Fourteen pilots did not feather the windmilling prop, and two feathered the wrong propeller; nine pilots failed to retract flaps as recommended, and one extended flaps too soon on approach; two pilots failed to retract the landing gear following engine failure after takeoff; four extended the gear too soon while maneuvering on approach to land, and three did not extend the gear on landing.

Beech Baron 58

However, most of the engine failure accidents took place not simply as a result of an error or forgotten duty but because the pilot ignored the limitations of the airplane. Commonly, adequate airspeed was not maintained, resulting in complete loss of control. Possibly the pilots were distracted by unknown problems; or possibly they had never accepted the fact that in a light twin the safety margin is considerably smaller than it is for heavier or turbine powered airplanes, where the available power is greater.

Light twin flying can be made much safer if the pilot is willing to prepare himself for possible power loss on every phase of every flight. To do this he must, of course, be thoroughly familiar with his manufacturer's recommended engine out procedure and performance data. In addition, there are two basic engine-out concepts which every pilot of twins should understand fully: *minimum control speed*, and *best single-engine rate of climb speed*. These are indicated for you (on recently manufactured aircraft) by the red and blue radials, respectively, on the airspeed instrument, but their significance goes far beyond simple figures.

1. **Minimum control speed, Vmc** (red radial). The single-engine pilot normally associates a stall, or loss of lift with loss of control. The twin-engine pilot (except for in-line twins, like the Cessna *Skymaster*) must also be concerned with loss of *directional control*. A twin with engines on the wing, after losing power in one engine, will yaw strongly toward that engine under most conditions of flight. The yawing tendency can be countered by the rudder, if there is sufficient airflow over the tail (i.e. airspeed). Vmc, as determined by the manufacturer, is the *minimum airspeed at which it is possible to recover directional control of the airplane without exceeding a 20 degree heading change, and thereafter to maintain straight flight with not more than* five degrees of bank.

The red radial indication is for a standard day at sea level, with full power, most unfavorable center of gravity, flaps in takeoff position, landing gear retracted, and dead prop windmilling. However, some airplanes will not maintain level flight at or near Vmc, let alone turn or climb.

Vmc will enable you to make a *controlled descent*—that is all, but it is important. If you lose directional control under these conditions a stall or spin is a possibility.

2. **Best rate of climb speed, single engine, Vyse** (blue radial). The blue radial is determined in the *clean configuration*, including feathered propeller, with the airplane flown at the recommended bank angle. Vyse is important even though it may not necessarily give you a positive rate of climb. It will make the most effective use of available power (least drag versus power ratio) whether you are climbing, holding level, or descending. The only exception in usage would be best (single engine) *angle* of climb speed, Vxse, when confronted by terrain obstacles.

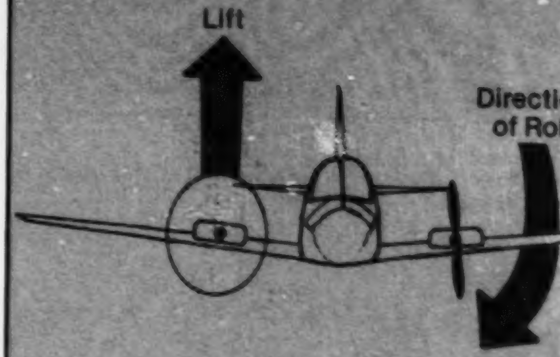
There is little point and considerable danger in attempting to climb or turn the aircraft in level flight at speeds much below Vyse or Vxse with one engine inoperative. Loss of directional control or lift or both are likely. If you have not attained Vyse at or shortly after the point of losing one engine, your safest course is to descend straight ahead, under control, and accept the consequences.

Other considerations that will assure maximum safety in light twins include:

- **Emergency planning.** Never take off without first determining how you will handle a power loss during the takeoff or climbout in this particular airplane, with a specific weight and balance, and with the given weather and airport environmental conditions.
- **Do not take off if you are still on the ground when an engine fails.** Regardless of runway remaining, your chances are better on the ground.
- **Never lift off before minimum control speed (Vmc)** is reached, and preferably not before Vmc +5 mph, or the manufacturer's recommendation, whichever is higher. Do not wait until the fence is near to obtain Vmc. If you cannot achieve it after a normal run, abort the takeoff; something is wrong.
- **Achieve and maintain best all-engine rate of climb speed after takeoff,** noting when you attain Vyse. Following engine loss, main-

Figure 1.

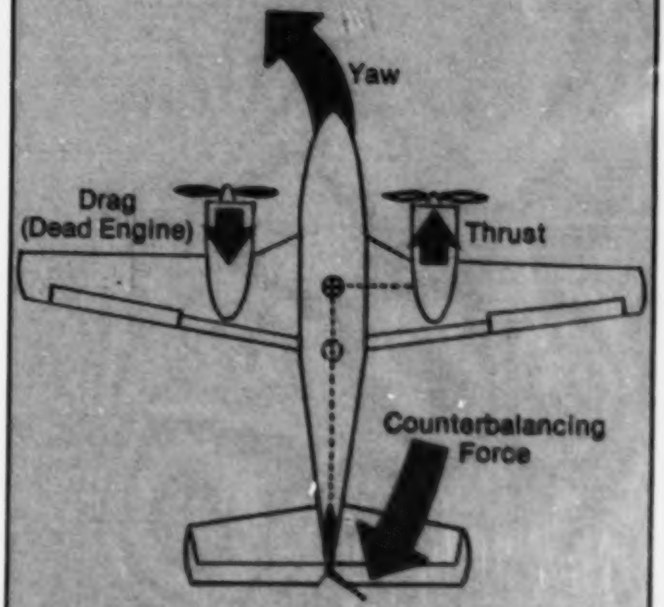
Yaw and Roll.



With one engine out the airplane will yaw and roll toward the dead engine. Yaw is countered with opposite rudder; roll with opposite aileron. Yaw may exceed rudder control capability if airspeed is below the minimum control speed.

Figure 2.

Minimum Control Speed (V_{mc}).



The net yaw of the operating engine is determined by thrust plus "arm" leverage (distance of engine from center of gravity). The net counterbalancing force of the rudder is the airflow plus the arm or distance of the rudder from the center of gravity. V_{mc} is the airspeed required for the rudder to provide a counter yaw of equal magnitude to the yaw from the operating engine.

Figure 3.

Performance Loss of Representative Light Twins with One Engine Out, Sea Level

	All engine climb (fpm)	S.E. climb (fpm)	Percent loss
Beech Baron 58	1,694	382	80.70
Beech Duke	1,601	307	80.82
Beech Queen Air	1,275	210	83.53
Cessna 310	1,495	327	78.13
Cessna 340	1,500	250	83.33
Cessna 402B	1,610	225	86.02
Cessna 421B	1,850	305	83.51
Piper Aztec	1,490	240	83.89
Piper Navajo Chieftain	1,390	230	83.45
Piper Pressurized Navajo	1,740	240	86.21
Piper Seneca	1,860	190	89.78

Figure 4.

Critical Engine.

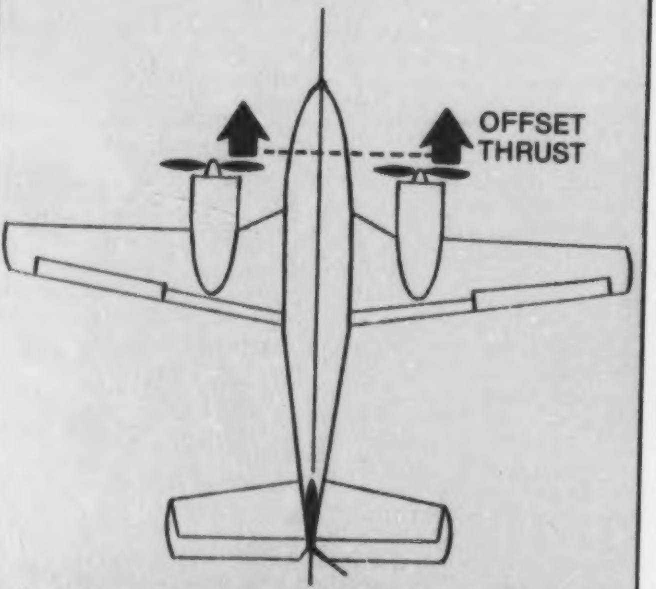


Illustration shows that thrust in twins (unless they have counter-rotating propellers) is offset to the right, producing a left yawing tendency at high angles of attack and high power settings. Failure of the left (critical) engine adds "normal" yaw to the yaw from assymetrical thrust, making directional control more difficult.

tain Vyse on approaching to land until you are committed to the landing; do not attempt to go around on one engine if at less than Vyse.

- **Avoid intersection takeoffs.** They reduce your options for aborting the takeoff, in the event of an emergency. Visualize the distance at various segments of the runway, so you know how far you can go after liftoff and still set the airplane back down on pavement.
- **Avoid marginal conditions.** Make sure that if you lose an engine on takeoff or climbout you will not have to struggle back to an airport that is below landing minimums, or have to dodge obstacles that are shrouded with clouds—you will be busy enough as it is. If you are right up at maximum gross weight, avoid a nighttime departure if possible, or a minimal length runway. In other words, you can choose not to put yourself in a position where you will have very little margin of error, even if that means postponing a departure, avoiding a certain airport, or leaving something or someone behind.
- **Practice emergency engine-out procedures in a realistic manner.** Not close to the ground, of course, but at altitudes that similate maximum gross weight with the actual payload on board. Learn just how your airplane is going to perform in the most adverse circumstances, and you may avoid some bad surprises.

A second engine on the airplane can be looked upon as a fail-safe component only to the extent that you are capable of flying with a power source on one wing and a mass of wind resistant material on the other. In light twins, this is a form of precision flying that is very intolerant of mistakes, and does not give you much opportunity to learn from experience. You usually have to do it right the first time. □

SOME DEFINITIONS

Critical Engine. The engine whose failure in flight would most adversely affect control and performance. In American-built airplanes (with propellers turning clockwise to the pilot), normally the left engine, since the right engine alone produces the greatest amount of yaw and roll. Exceptions are airplanes with counter turning propellers, like the Piper *Seneca*, or push-pull twins like the Cessna *Skymaster*. However, in the *Skymaster* the rear engine is considered critical, since the pusher prop is more effective than the tractor. Failure of the rear engine in this airplane may go unnoticed by the pilot, unless he checks his instruments.

Cessna Skymaster

Vxse—Best *angle* of climb speed, one engine out. Produces more rudder drag than best rate of climb, so use only as needed (altitude vs. distance).

Vsse—Safe single-engine airspeed. Never cut an engine intentionally below this airspeed. Use only for training, and *at altitude*. This is an industry concept, not an FAA computation, and performance will be affected by airplane and environmental conditions.

Blanche Noyes

The Grande Dame of Air Marking

Many a lost and lorn pilot, seeking worriedly to identify the nondescript hamlet below the wing of his sputtering airplane, has breathed a grateful sigh of relief to find the name of the town lettered broadly on the roof of a barn or side of a hill. The countryside of the United States, especially in the early days of flight, was ideal for flying because of the large areas of open space available for forced landings, but it was also very easy to get lost in during an emergency, when fuel was running low or the engine had given its last gasp. All of this changed during the middle 1930's, thanks in large measure to a remarkable stage actress-turned-aviatrix who became the patron saint of lost pilots.

Blanche Wilcox was born in Cleveland just after the turn of the century. The daughter of a construction contractor, she displayed an independent character as a young girl, abandoned formal studies in favor of the stage, and became a well-known actress on Broadway and the popular theaters of the east coast. While starring in a melodrama called "White Cargo" in Pittsburgh in 1927, Blanche was invited to a dinner honoring America's newest hero, Charles Lindbergh, then touring the country after his conquest of the Atlantic. Her dinner companion was a handsome local airmail pilot, Dewey Noyes, a vociferous advocate of aviation.

The deeply smitten Blanche was willing to listen to Dewey talk about aviation, or any other matter, for hours on end, as long as he talked only to her. She followed him out to the airport, became his confidante, his pupil (she soloed after four hours of dual), and within a year his wife. Her husband had prodded her into the cockpit with the argument, not entirely serious, that she could be living proof of how simple it was to fly "if even a silly woman could learn."

The first certificated woman pilot in Ohio and one of the first ten in the country, this diminutive darling of the stage became a tough-minded, bruised-knuckled racing competitor. Her first big race was the Women's Air Derby (later to become the annual "Powder Puff Derby") in 1929, from Santa Monica, CA, to Cleveland. Flying a Beech *Travel Air Speedwing*, Blanche experienced an engine fire over the Arizona desert, landed, put out the fire with sand, bent her landing gear on takeoff, landed on one wheel in Pecos, TX, made repairs, and kept on flying. She came into Cleveland three places behind Amelia Earhart, the winner, and fellow founder of the "Ninety-Nines" women's flying association.

Soon an aviation celebrity, Blanche was able to interest well-known business leaders in flying, including the then 91-year old John D. Rockefeller, Sr. who took his one and only airplane ride with her. Success as a racing pilot quickly brought Blanche prominent jobs as a demonstration pilot for aircraft companies, and she was also in demand as a lecturer on flying.

In 1935, after Dewey Noyes had taught Blanche instrument flying, the pair began seeking sponsors for an around-the-world flight which they hoped would be filled with adventure and excitement. Their dream came to an end in December of that year when Dewey was killed in an airplane crash.

The young widow found herself at a crossroads of life that seemed to offer no future. Dewey's death had soured her on flying for the moment, and her stage career was too far behind her to return to: *what else could she do?* As she mulled over the problem while "boring holes in the sky" with her airplane over Ohio farmland, she found herself thinking about the many fine pilots she had known who had perished in crash landings after becoming lost in bad weather over unfamiliar countryside. *If every local community could realize how important aviation would be one day, how much they could do to help by simply putting up some kind of marker that airborne pilots could read, how many fine young lives could be saved . . . Surely, she could persuade them.*

From that moment on, "air marking" became her passion and her vocation. Over the years ahead she continued to race successfully, winning the 1936 Bendix race, New York to Los Angeles, over a large field that included famous male pilots; breaking speed records; flying the mail; testing and demonstrating aircraft; but all this was secondary to her determination to identfy the nation's byways for airmen—a project she labored with for the next 35 years.

Blanche found an ally in the (Federal) Bureau of Air Commerce which was trying to start up a national program of air-marking. The nation was divided into 15-square mile segments, with hopes of locating an air marker in each—a grandiose plan that never fully succeeded. Appropriations soon ran out, but Blanche, who was officially appointed an air marking pilot in 1936, drummed up support from local chambers of commerce and other civic groups from one end of the country to the other. Soon thousands of towns and villages were displaying their name to the sky.

Wherever she flew, whenever she appeared at a banquet or forum or lecture hall or private salon, she never lost an opportunity to propagandize her favorite project. She succeeded so well that when World War II reached America in 1941, the War Department became concerned that her signs could aid enemy pilots who might penetrate our borders. Within a few months, some 2,000 air markers, located within 150 miles of the Atlantic or Pacific costs, were removed or screened over.

But the day the war ended, Blanche and her co-workers, spurred by the Ninety-Nines, were back at work getting the markers up again and new ones painted. Blanche flew endlessly, checking on existing markers, campaigning for new ones. By the time that Blanche retired as Chief of Air Marking for FAA, on January 1, 1972, over 75,000 communities had been identified for airmen.

The trophies, cups, gold and silver medals, awards, and other honors Blanche Noyes collected in 45 years in aviation were almost too numerous to be contained in her Washington, DC, apartment home. She is undoubtedly the most decorated woman pilot of all time, and she has known and been admired by most of the aviation greats of her era. She never regretted turning her back on the stage, and she still prizes, above all other honors, the fact that she was the first woman pilot ever hired by the United States Government. She knows Dewey would have been proud. □

SOCKS THAT STAY UP. A modern version of the venerable wind sock at general aviation airports has been developed by FAA's Experimental Center. The new sock, made of nylon coated with vinyl, should last up to a year and a half before tearing or fading. Testing has shown good characteristics for approximating wind velocity. The socks pictured above indicate (clockwise from upper left) 5 knots, 10-12 knots, 21-27 knots, and 25-30 knots. Field tests are being conducted at general aviation airports across the country.

Survey Shows Tachometer Calibration Errors Are Widespread

A recent nation-wide investigation of mechanically actuated tachometers in general aviation aircraft has disclosed that a high percentage of the tachometers are inaccurately calibrated. The random inspection of 2,517 aircraft of popular makes revealed that while most readings were within 75 rpm, plus or minus, of being accurate, some errors ranged from minus 300 rpm to plus 270 rpm. The greater part of these errors were negative (the engine turned faster than the tachometer indicated).

Generally, tachometers in older aircraft were found to be no less accurate as those in newer aircraft.

Operating an aircraft with significant negative tachometer error can shorten propeller fatigue life, making the hazards from nicks in the blades even more critical. Additionally, it can produce stresses beyond those anticipated in propeller design.

Negative tachometer error can also result in higher than anticipated fuel consumption, and may be a factor in some heretofore unexplained incidents and accidents involving fuel exhaustion. For example, applying the average tachometer error found on four typical general aviation aircraft to the performance figures of those aircraft revealed fuel consumption increased by as much as half a gallon per hour. Flight endurance was reduced by as much as 42 minutes, depending on aircraft fuel tank capacity.

A positive tachometer error, meaning the *engine* was lagging behind the tachometer and not developing *enough* actual power, could also pose safety problems, especially on takeoff in a high density altitude, at airports of high elevation, or when applying power for a go-around in such conditions.

Pilots whose planes have not had a recent tachometer calibration check might wish to be cautious about planning flights near the aircraft's maximum fuel range.

Checking the accuracy of tachometers is a routine maintenance operation that requires no disassembling of the aircraft engine or instruments. Significant errors, however, should be corrected by a qualified maintenance facility (usually an instrument shop).

Tighter Commuter Security

The security regulations covering scheduled air carriers would be extended to commuter airplanes carrying 20 or more passengers under a Notice of Proposed Rulemaking published November 1, 1979. The Airline Deregulation Act of 1978, which has led to many small commuter airlines taking over segments formerly flown by major carriers, requires the smaller airlines to maintain equivalent security wherever feasible.

The NPRM cited 43 hijackings in the past 10 years of commuter activity, with 24 of the 43 occurring after stricter measures were instigated for certificated air carriers. Following airline deregulation, commuters and air taxis now publish their schedules, which increases their vulnerability to potential hijackers.

Previously commuter pilots were only required to be acquainted with emergency inflight procedures in the event of a hijack. Passenger and luggage screening would become mandatory, if the proposal is enacted, and procedures for protecting planes from unauthorized access would be followed. Provisions for X-raying or hand examination of carry-on baggage would also be required.

Commuter operators of airplanes carrying 19 or fewer passengers would be required only to verify the identity of each passenger prior to boarding and to keep the planes from unauthorized access.

Comments will be accepted until February 29, 1980 and should be sent in duplicate to FAA, Office of the Chief Counsel, ATTN: Rules Docket (AGC-24), Docket Number 19726, 800 Independence Ave., S.W., Washington, DC, 20591.

Hazard in Avgas Thefts

Pilots have reported recent thefts of fuel from parked airplanes which could have resulted in inflight accidents. In Riverdale, CA, thieves not only removed the fuel from a *Skyhawk* but also removed some of the valves and fittings, with the result that the fuel systems probably would have failed in flight if the aircraft had been refueled and flown without proper inspection. Fuel thefts appear to be on the increase: In spite of the fact that many pilots now lock gas caps, fuel can be taken from fuel drains and petcocks, which cannot be locked.

Safety Seminars Sweetened

Pilots who attend FAA-approved safety seminars in 1980 will be eligible for $25,000 worth of flight instruction gift certificates plus a drawing for a $50,000 airplane of their choice. Prizes are being given by the General Aviation Manufacturers Association (GAMA) as part of their year-long drive, "Safe Pilot '80," in support of FAA's Accident Prevention Program.

Safety seminars will be held at intervals in all sections of the country. For local schedules consult your FAA Flight Standards District Office or contact GAMA, Suite 517, 1025 Connecticut Ave., N.W., Washington, DC 20036.

New Commuter Standards

The Civil Aeronautics Division of Transport Canada has published a new Air Tourist Information pamphlet (TP771) for pilots flying to Alaska over Canada, especially along the ALCAN highway. The pamphlets are available to pilots at FAA Flight Service Stations and GADO's and FSDO's along the southwestern Canadian border and in Alaska. Another Transport Canada pamphlet (TP2166), "Flying the Alaska Highway in Canada," is available from Transport Canada, Place de Ville, Ottawa, Ontario, Canada, K1A ON8, Attn: SLPP.

• Checking Up On Doc

I would like to comment on the article "Density Altitude and the Maximum Climb" in the October 1978 issue. Most airplanes today have performance information which includes the effects of temperature. Manufacturer's Handbook or Owners' Manual has performance data for takeoff ground roll and total distance over a 50-foot obstacle, including such variables as temperature, altitude, surface, and wind conditions. This information is required to be in the aircraft, so shouldn't the Engine Doctor have suggested checking it?

Carlos L. Blacklock
Wichita, KS

The Engine Doctor's article was for special conditions in high elevations, which would not necessarily be covered in the owner's manual.

• Tach Settings and Prop Tip Stresses

I recently came across the article "How Sharp is Your Tach?" in the Nov/Dec 1977 issue and now I'm hesitant to use full power for takeoff because I don't want to overstress my propeller and lose it "up there." What to do?

M. M. Furney
Panama City, FL

With normally aspirated engines always use full power on takeoff. The chart in the article you refer to is for full throttle, level flight. The figures do not apply on takeoff.

You might also have a calibration check run on your tachometer. See page 14 of the Jan/Feb 1980 issue.

• Midair! Midair!

Why was the "N" number changed on the airplane on the cover of the September/October 1979 *General Aviation News?*

Would it be on account of how close you came to him in taking the photograph, and perhaps he would be able to identify the FAA as the culprit and file a near-miss report? Or was this taken by a tower operator whose attention the pilot was attempting to raise?

G. S. Waltman
Gt. Neck, NY

No cover-up intended. The photo was taken with a telephoto lens at a safe distance, but the layout artist assumed we might have had some reason not to identify the owner. He evidently did not fool you or some of our other eagle-eyed readers.

• Hanging by a Thread?

The author of "Inside the Fuselage" (May/June 1979 issue) tells of his apprehension when looking at the thin elevator steel cable on which his life depended. My emotions were similar when I first saw the two stabilator pins on which my life literally hangs in my *Seneca II.* The pins, the only connection between the tail and the fuselage, looked slightly thicker than a pencil. I realize the stabilator carries only a minor part of the aircraft's weight, but I shudder to think of those pins breaking in turbulence.

Felix Voirol
Fullinsdorf, Switzerland

According to manufacturer specifications, each of these two pins, or bolts, has a shear strength of 4,650 pounds. The maximum gross weight of a Seneca II is 4,750 pounds, of which the stabilator carries a relatively small load, so there is a margin of safety. A check with the Maintenance Analysis Center revealed no Service Difficulty Reports on the pins on the PA-34.

• Attitude or Angle-of-Attack Indicator?

At one point in the "Stall Awareness" article, which appeared in the September/October 1979 issue, the writer said. ". . . since most light general aviation aircraft do not have attitude indicators . . ." On the contrary, one would be hard pressed to find an airplane these days without an "attitude indicator," otherwise known as an artificial horizon.

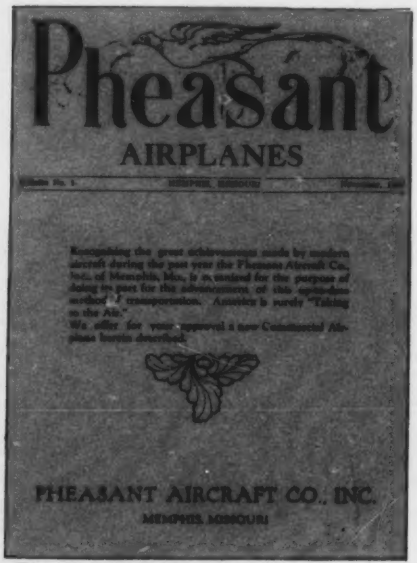
William H. Hutchin
Hayward, CA

Although not a required instrument, the attitude gyro (or attitude indicator, artificial horizon, whichever you prefer) has been standard equipment in general aviation for many years. The intended phrase in the article was 'angle-of-attack indicator" which is not so so widely found in light aircraft.

• The Missouri Pheasant

Please advise if enclosed copy of Pheasant Aircraft Bulletin is the same company mentioned in the Famous Flight article on Steve Wittman in the May/June issue.

Louis L. Noble
Dow, IL



Pheasant

AIRPLANES

Recognizing the great achievements made by modern aircraft during the past year the Pheasant Aircraft Co., Inc., of Memphis, Mo., is organized for the purpose of doing its part for the advancement of this up-to-date method of transportation. America is surely "Taking to the Air."

We offer for your approval a new Commercial Airplane herein described.

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The very same. Many thanks for providing us with the brochure.

• Again, Logging Time

In your "Logging Time" in the March/April 1979 *General Aviation News,* you refer to crosscountry "legs." I can find no reference to legs in the regulations. Also, there is apparently no requirement that you fly nonstop between these points on a crosscountry, so could a student pilot take an overnight crosscountry?

William E. Barnes
Lanchaster, CA

Reference to portions of crosscountry flights as "legs" does not appear in the regulations but is used in pilot jargon. For the private certificate, the regulations call for "ten hours of crosscountry flight, each flight with a landing more than 50 nautical miles from the point of departure and one with landings at three points, each of which is more than 100 nautical miles from each of the other two points . . ." While not a general practice an instructor could approve an overnight crosscountry flight for the purpose of this requirement.

[illegible] from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-80[illegible] Washington, D.C. 20591

• "AM Weather" in Georgia

Which stations in Georgia broadcast the home weather show referred to in *FAA General News* issue for September/October 1979?

Joe L. Sims
Commerce, GA

Public Broadcasting Stations WGTV (Channel 8) in Athens, Georgia and WETV (Channel 30) in Atlanta both broadcast the home weather show. Check your local listings for the time. Individual inquiries for specific areas can be made at local FAA General Aviation District Office.

• Change of Address

I am a student pilot with a student certificate and 2nd Class Medical. I will be changing addresses shortly and would like to know if a student pilot must comply with FAR 61.60 requiring that Oklahoma City's Airman's Certification Branch be notified? If so, will I get a new certificate with whatever endorsements I already have?

Name Withheld

Affirmative. Send your name, old address, new address, Social Security Number, and certificate number. No new certificate will be issued, but the address change will be in the computer. Unless this is done, the student certificate—or any pilot certificate, for that matter—is invalid after 30 days from the move.

• Meet Your Airplane

Our company has published a safety pamphlet called "Meet Your Aircraft." The pamphlet makes a good open book quiz (with answers) about the operating characteristics of the pilot's particular aircraft and also covers some important FAR's and weather data. We are supplying complimentary copies which may be ordered from the FAA Accident Prevention Staff AFO-806, Washington, DC 20591.

Fred McGowan
Ins. Co. of N.A.
Philadelphia, PA

INSTRUMENT CORNER

• Visual Descent Point and MAP

What is the difference between the Visual Descent Point and the Missed Approach Point, if any?

R. Kane
Venice, FL

The Missed Approach Point, MAP, is the point on the approach course of an instrument landing at which the approach must be discontinued and a missed approach procedure initiated if runway environment is not clearly visible to the pilot.

The Visual Descent Point, VDP, is a predetermined point on the course of a non-precision DME/VOR approach at which normal descent from the Minimum Descent Altitude may commence, provided the runway is visible. The purpose of VDP is to help the pilot establish a normal descent-to-land angle. The purpose of MAP obviously is to terminate an approach when visibility to the runway is insufficient.

VDP, identified on approach charts by the letter V, is being introduced in selected non-precision approach procedures. This is not a required procedure.

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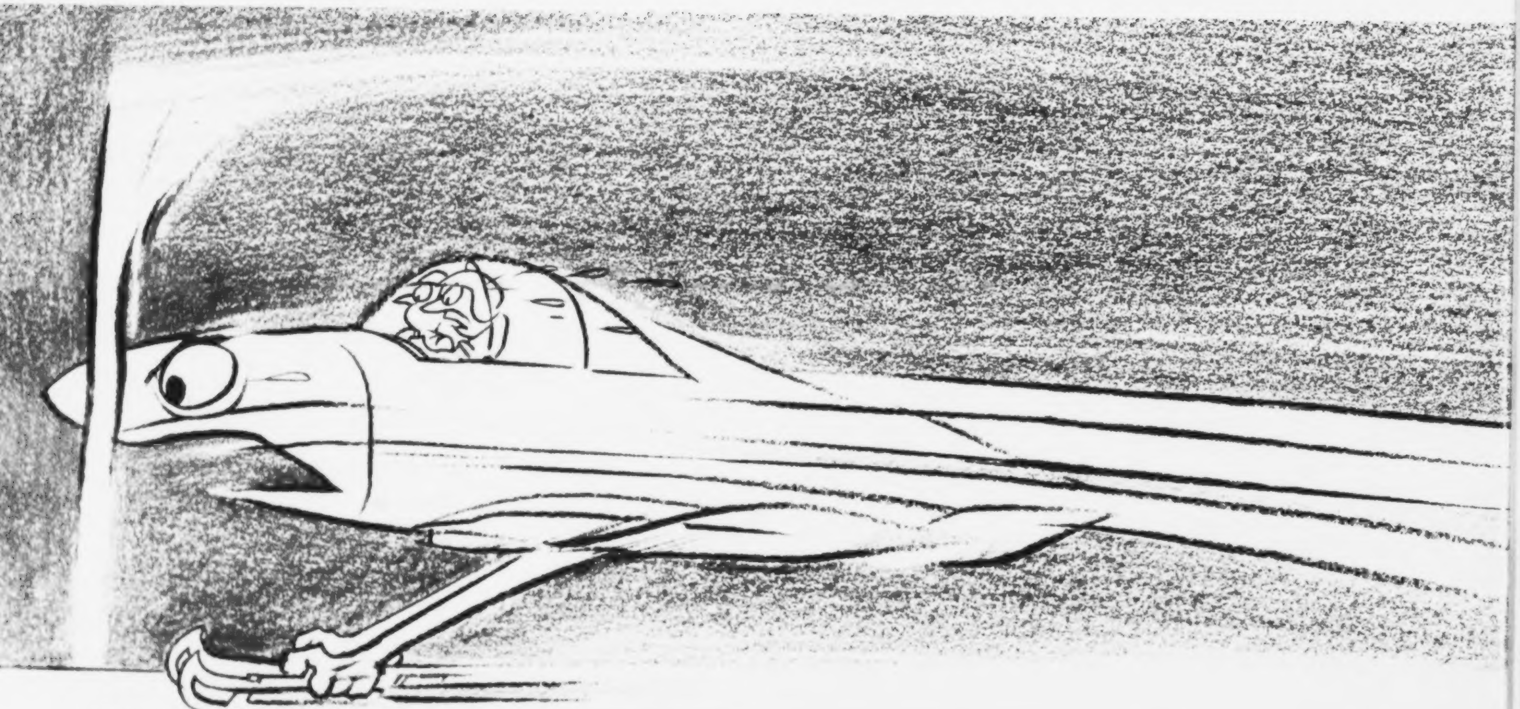
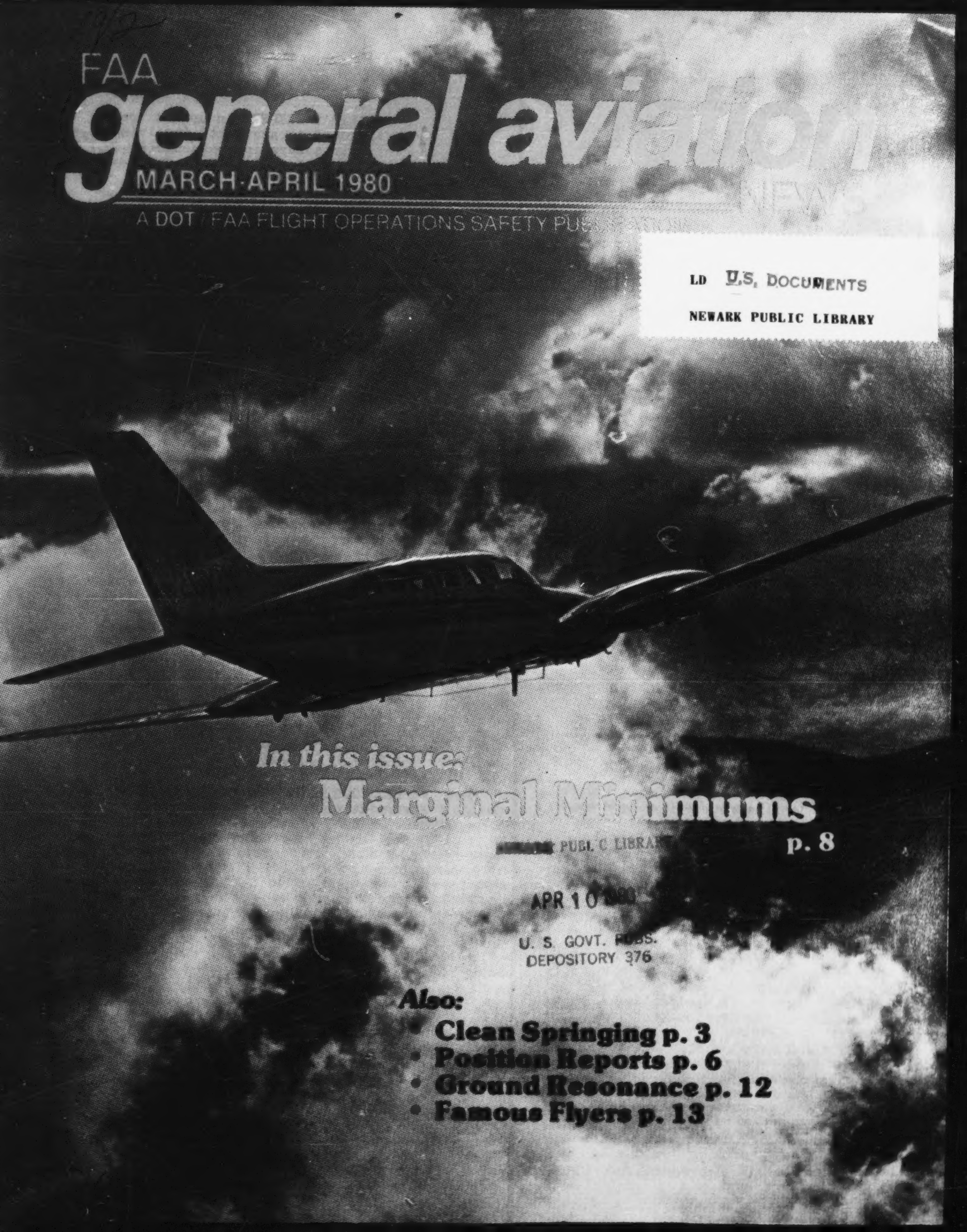


'Tis the season
For runway freezin'

Osborn



FAA general aviation NEWS

MARCH-APRIL 1980

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FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION

MARCH-APRIL 1980
Volume 19, Number 2

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FAA GENERAL AVIATION NEWS is published by Flight Operations, AFO-807, Federal Aviation Administration, Department of Transportation, Washington, D.C. 20591, in the interest of flight safety. The magazine is designed to promote safety in the air by calling the attention of general aviation airmen to current technical, regulatory and procedural matters affecting the safe operation of aircraft. Use of funds for printing FAA GENERAL AVIATION NEWS was approved by the Office of Management and Budget through August 31, 1980. All printed materials contained herein are advisory or informational in nature and should not be construed as having regulatory effect. The FAA does not officially endorse any goods, services, materials or products of manufacturers that may be mentioned. ***Certain details of accidents described herein are altered to protect the privacy of those involved.***

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BRIEFS

YOUR BROTHER'S KEEPER? An upward trend has been noted in accidents involving student pilots carrying passengers. The regulations that forbid this practice are sometimes taken lightly, with fatal consequences. In a recent accident in Arizona where the student pilot was killed and his passenger crippled, several persons at the airport knew of the student's intentions before the flight but took no action to notify FAA. Illegal flying is a hazard to everyone in the community. Pilots especially cannot afford to look the other way.

AIDS YES, CRIBS NO. Persons taking written tests for airman certificates are allowed to use navigation computers and plotters, rulers, protractors, and also electronic calculators under the supervision of the tester. However, the use of any aid that has information on it that is not part of its function is not permitted. Guidelines are provided in Advisory Circular 60-11A (Aids Authorized for Use by Airmen Written Test Applicants), available free from the DOT Publications Section, M-443.1, Washington, DC, 20590.

SWB DISCONTINUED. The hourly Scheduled Weather Broadcast reports from VOR's and NDB's with voice capability have been discontinued from all FAA facilities except those in Alaska, effective April 1, 1980 (no fooling). Alternate sources of weather reports are those made randomly from navigational facilities, the En Route Flight Advisory Service at selected FSS's, and the Transcribed Weather Broadcasts over low-frequency NAVAIDs and VOR's.

SAFER SAFETY BELTS. Higher standards for seat belts go into effect as of December 4, 1980. After that date, metal-to-metal latching belts will have to be installed on all standard category certificated U.S. aircraft. Inspectors will be checking for the new type belt in annual and 100-hour inspections.

PARLEZ VOUS FRANCAIS? If you are planning any vacation or business flying into Quebec, Canada, you might want to brush up on your French. Quebec is predominantly French-speaking, even in the control tower. The radio transmissions you might be listening in on near a terminal could be of little use unless you know the language. For your own transmissions, of course, you can always use English.

WASHED OUT BY PROP WASH. Sharing an airport with jets and turboprop aircraft can be a pain, as one Cessna 172 pilot found out recently when he was cleared to taxi behind a Coast Guard C-130 at Concord, CA. The 130's prop wash lifted the 172 up and flipped it over. The pilot and passenger were slightly injured but the Skyhawk was substantially damaged. You can request ATC to have any heavy airplane you have to taxi behind ''throttle back;'' however, you should first make every effort to taxi far enough behind a heavy or in such a manner that prop wash or jet thrust is either dissipated or directed away from you.

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Clean Springing

Looking for Trouble in the Landing Gear

The flowers that bloom in the spring (at last!) are a reminder, to the concerned aircraft owner, of the annual wash-down and scrub-up he has been promising his pet bird for many a week. With warmer days at hand it is time to clean off the muck and grime of another winter and inspect the airframe to see how well it is prepared to handle a new season of flying. Cleanliness may or may not be next to Godliness, but it has a miraculous way of bringing to light all kinds of hidden or unsuspected weaknesses in the aircraft that should be attended to before the first flight of spring. One area that often gets overlooked in these wash-down/inspection rites is the undercarriage.

The pilot may dutifully hose off the landing gear but he may not take the time to get down underneath the airplane and carefully inspect its underpinings—perhaps this is because it means assuming an uncomfortable position and maybe getting one's hands or clothes soiled. But it is important.

The tires, for example, can undergo significant changes over the winter, even if the aircraft is not flown. Cold weather does no harm to rubber, but dampness promotes rot. Fuel, hydraulic fluids and many aviation solvents will cause rubber to disintegrate; even the fumes are harmful, so it is a good idea to remove such materials from hangar floors, where planes are stored when possible.

Ozone, which is produced from a variety of sources (fluorescent lights, electric motors, battery chargers, generators, welding equipment, etc.) also promotes rapid aging of rubber. Look over the sidewalls carefully for evidence of weather checking, or ozone cracking. You may have to scrub the rubber first to get a good look. Any damage that exposes body cords usually indicates the tire is unsafe to fly with, and is probably ready for the scrap heap.

Although heat and friction are the primary causes of normal tire wear, cold weather landings are a potential source of *immediate and severe* tire damage, because of the prevalence of pot holes or paving cracks in freezing climates. Striking sharp edges of any kind can cause excessive tire flexing and allow sidewalls to become crushed by the wheel flanges. This is especially likely when the tires are underinflated, as is frequently the case in winter. Since tire pressure varies according to temperature, losing one psi for every 4° F. drop, tire manufacturers recommend that pressure be checked with a gauge before each flight. (This chore should be done outdoors, not in a heated hangar.) One hard impact against broken pavement can ruin an underinflated tire.

Spring is also a good time of the year to decide whether you are going to get through another summer of flying on the same set of treads. Make sure that you have enough tread left to prevent wear on the cord body. Significant degrees of uneven wear developing on the main gear tires could induce swerving on wet runways. Be on the lookout for any small foreign objects that may have worked themselves into the tire; if ignored, sooner or latter they will cause trouble.

The landing gear hardware itself, whether of spring steel or pressurized strut design, also needs to be thoroughly cleaned in order to be properly examined. A hose and a brush and patience will usually remove all the mud, sand, debris, etc. that has accumulated; avoid solvents that are not approved by the manufacturer (or your mechanic), for the reasons given earlier.

On inspection of the hardware you will be looking chiefly for cracked metal parts, loose or bent connections, and improper strut extensions. Having someone gently rock the wing (fore and aft, as well as vertically) while you examine the gear will help reveal any excess play in the fittings. See that all bolts and nuts are secure and properly safetied.

Nose and tail wheels may have developed problems arising from their steering function. The shock strut of most nose wheels has a cam locking device which automatically returns the wheel to a straight-ahead position when the airplane is not airborne. A defective cam is indicated if the wheel remains turned to one side when weight is taken off the wheel. Many tail wheels have a manual locking mechanism which is essential for controllability on takeoff, and which can be checked with the tail raised. The control horn and linkage of the steering mechanism of tail wheels also should be checked for freedom of movement and for security of the attach points.

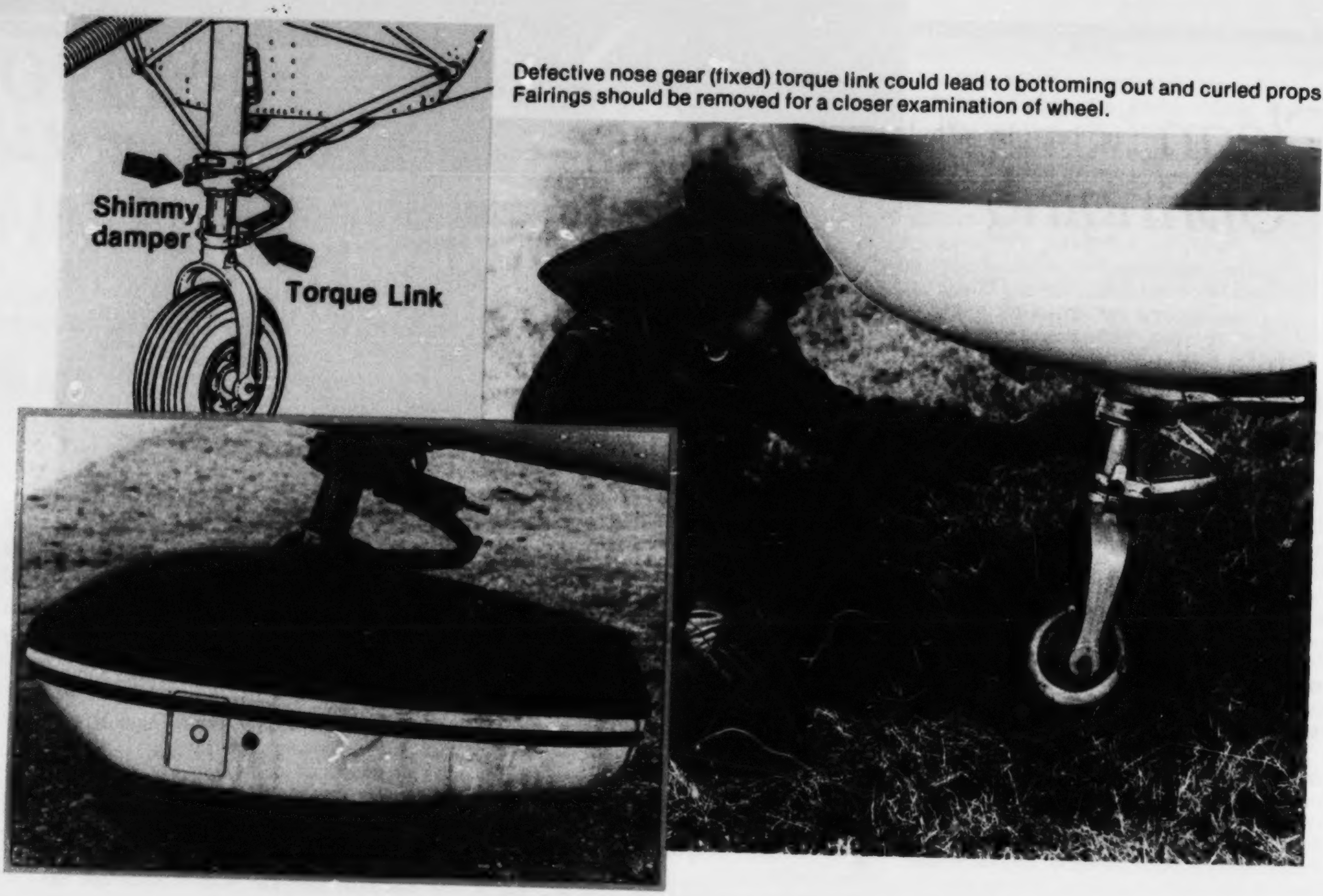
Shock absorbtion on nose wheels and most main landing wheels is accomplished by means of a telescoping tube, which compresses a fluid against air. Look for leaks around the seals and at the hose attachment points, flex coils, and connectors. Check for uneven or improper extension of the struts. Follow the manufacturer's instructions when replenishing the fluid and air pressure charge in the shock absorber.

The wheel wells of retractable landing gear also need a periodic cleaning with a hose, and this is a good time for the owner to have a look at its operating condition. Before you crawl under the airplane, make sure the gear indicator lights are showing down and locked. And you might want to lock the cockpit, to make sure no one fools with the controls while you are lying face-up under the belly. Inspect for leaks, loose connections, unsafetied bolts, and any indication of wear from misalignment of moving parts. If you can have the airplane jacked up by a mechanic, you can cycle the gear check to the closing and fit of the well doors.

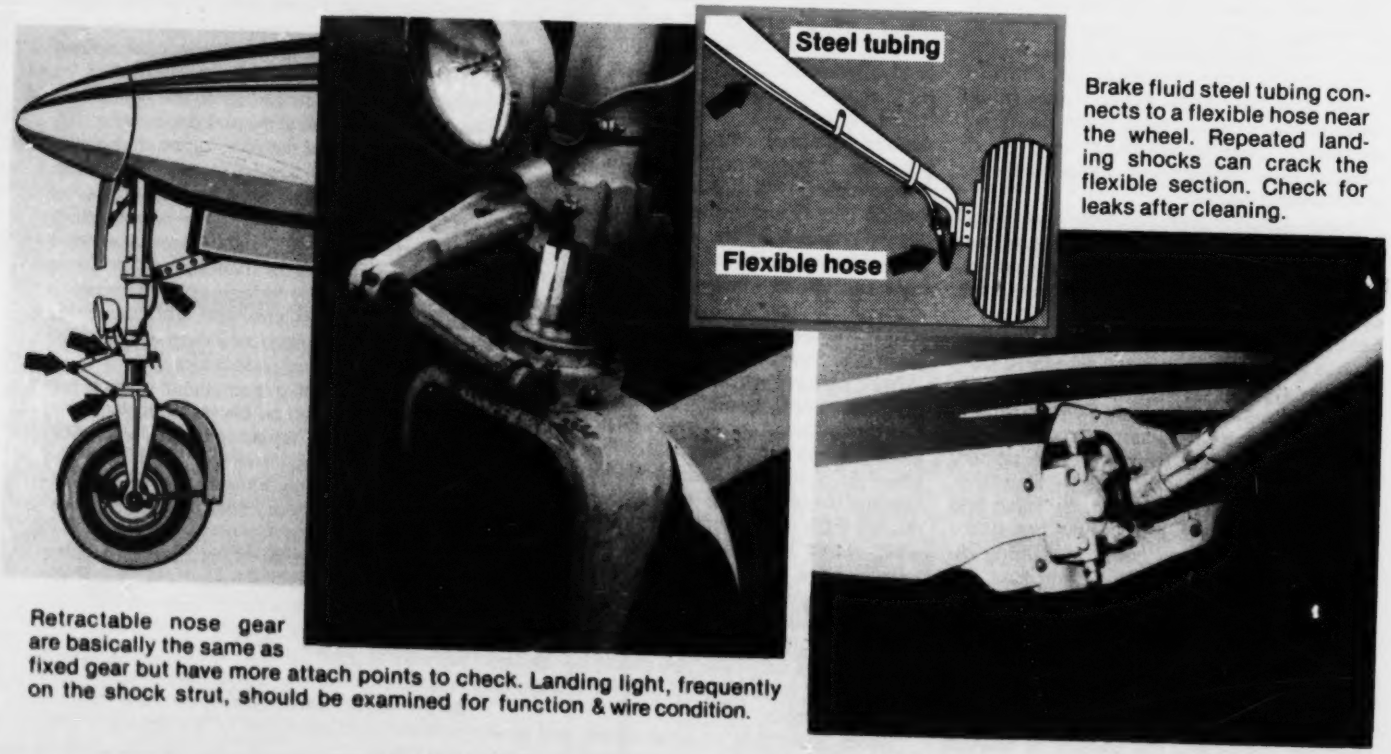
If yours is one of the older types of airplanes which use woven rubber cords or rings as shock absorbers, look these over for fraying, loss of elasticity, or deterioration. Oil or fuel drippings will shorten their life. The cords are color coded to indicate the year of manufacture, with one color thread usually indicating the first half of the year of manufacture, and two threads the second half. A maintenance shop will have the manufacturer's color code tables.

Simple, preventive maintenance which can be performed by an owner includes: removing and installing tires, replacing elastic shock cords and rings, servicing shock struts with fluid and air, cleaning and greasing wheel bearings, replacing safety wires or cotter pins, and lubrication of the gear.

More serious problems, of course, must be dealt with by a qualified mechanic, but if the pilot/owner bird-dogs the trouble without waiting for the annual inspection he may save himself a lot of good flying time and money as well. A good close look at the landing gear and tires on the first preflight of spring can help keep the bottom from falling out of the season's inaugural flight. ☐



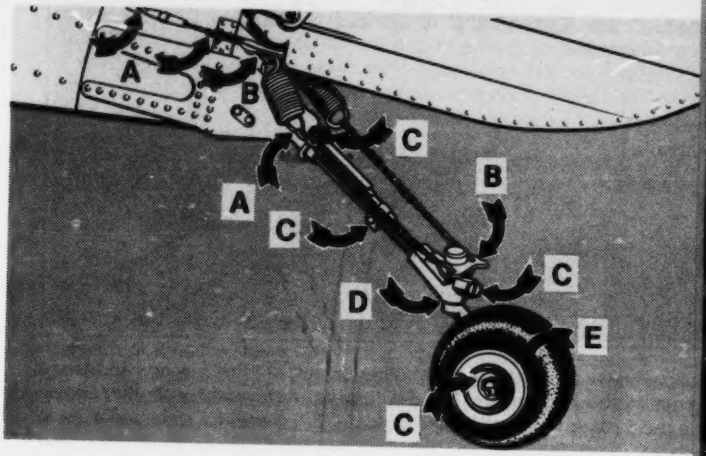
Defective nose gear (fixed) torque link could lead to bottoming out and curled props. Fairings should be removed for a closer examination of wheel.



Brake fluid steel tubing connects to a flexible hose near the wheel. Repeated landing shocks can crack the flexible section. Check for leaks after cleaning.

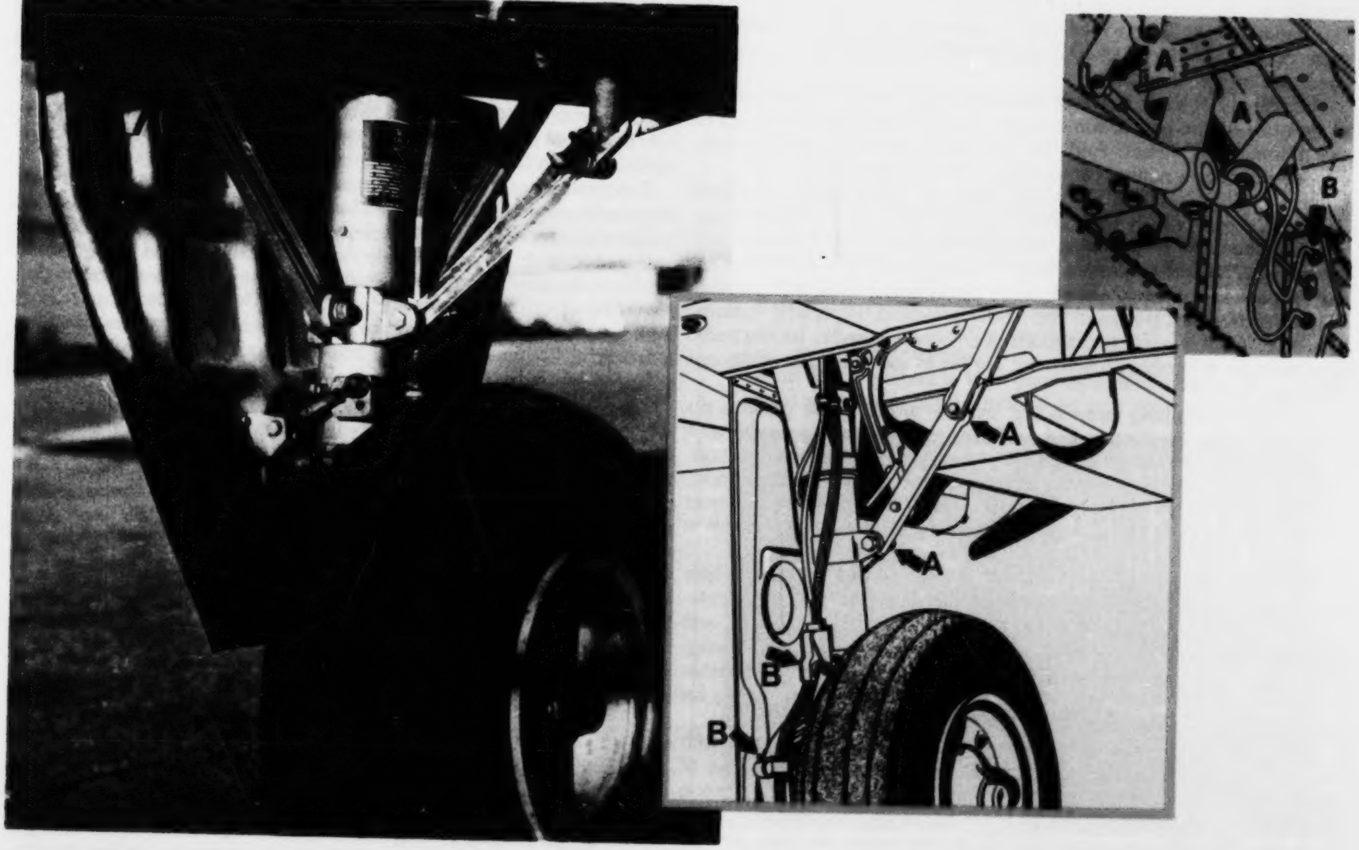
Retractable nose gear are basically the same as fixed gear but have more attach points to check. Landing light, frequently on the shock strut, should be examined for function & wire condition.

On a steerable tailwheel, inspect steering cables for tension and wear. Check security and safetying of nuts and bolts (C), and wear on horns (B). Look for cracks in wheel rim (E). The swivel (D) must move freely and be well-oiled.



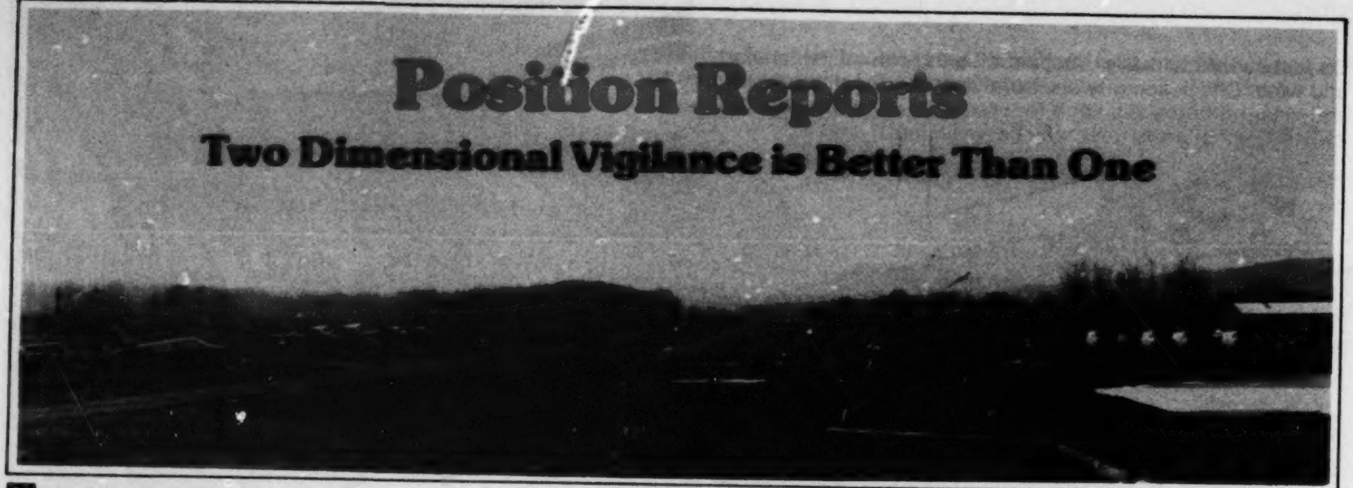
Grime on gear can mask defects. Tires worn no more than 70% can be retreaded unless they have other visible damage.

Retractable main gear has numerous attach points (A) to check. Inspect hoses (B) for leaks or crimping during retraction. Check the wheelwell for chafed areas which indicate gear is rubbing and may jam or lock inadvertently.



Position Reports

Two Dimensional Vigilance is Better Than One



The midair collisions and near misses which make headlines in the newspapers usually occur at busy airports with a mix of large and small airplanes. But San Diego notwithstanding, the fact is that most midair collisions occur *between general aviation aircraft at small, uncontrolled airfields* where traffic density is not a problem. National Transportation Safety Board files show that over the two year period 1977–1978 there were 66 midair collisions between general aviation aircraft, of which 33 took place in the traffic pattern at an uncontrolled airport. Thirty of these accidents occurred during landing or approach to land.

Weather was not a problem in any of these accidents, and most of the 60 pilots involved in the landing accidents had considerable experience. Only four were students; the others held private, commercial, or ATP certificates.

If traffic density, weather, and pilot experience are not the factors in these accidents, why do they occur? Possibly because of an overdependence on visual contact.

The scarcity of traffic at some airports in itself seems to promote lack of vigilance on the part of some pilots: what the eye does not expect to see it sometimes misses. And the rural background of some country airports provides a natural camouflage at certain seasons.

Even with the best of visual acuity there are certain relative positions or "blind spots" from which aircraft are hidden from one another, especially when one is high wing and the other low wing. Concern with perfecting a pattern procedure tends to concentrate one's attention on the airspace immediately ahead, or on panel instruments, and possibly to neglect the areas overhead and below or behind. Pilots who customarily fly only out of controlled airports often become used to having traffic separated by the control tower, and are lax in assuming this additional responsibility.

Another contributing factor is the fact that airport traffic patterns do not make up a fixed track, like a race course, but vary in width and length according to aircraft and pilot, as well as wind speed and direction. Although recommended pattern altitudes may be posted in the airport, strict compliance is not always the case. Vertical collisions are the most common form of midair accident. A recent accident in the southwest is typical:

On the morning of September 28, 1978, a Thursday, a rented Piper *Cherokee* departed Mangham Field, near Fort Worth, TX on a cross-country flight to Giddings, TX. On board were the pilot, his wife, and another passenger. They arrived without incident, and returned to Mangham that same afternoon, reaching the airport traffic pattern at approximately 4:45 p.m. They entered the pattern on the downwind leg for runway 35, an asphalt strip 2,550 feet long.

A second *Cherokee* entered the pattern at about the same time, with an instructor and a student pilot on board, returning from an hour of flight training. According to his later statement to National Transportation Safety Board investigators, the flight instructor announced his position over the UNICOM frequency (122.8) on downwind, on base, and on final approach. He said that he monitored UNICOM during the entire sequence and heard reports of other aircraft at other airports, but heard nothing about Mangham. Nor did he have any awareness of other aircraft in the pattern until just before impact: "We were in a stabilized glide at about 75 knots . . . when the other aircraft suddenly appeared in our lower left windshield, moving from left to right in front of us, not more than thirty or forty feet away and closing. I pulled up and to the right instantly but could not avoid contact."

The leading edge of the instructor's *Cherokee* collided with the right horizontal stablizer of the lower aircraft. The instructor was able to retain control of his airplane and complete the landing. The other *Cherokee* crashed out of control, about one-quarter mile from the runway. All three persons on board died of injuries.

One witness on the ground had seen two low-wing airplanes flying south at about 4:50 p.m., one at an altitude of about 700 feet AGL, the other at about 200 AGL. A second witness observed the two planes flying one above the other from the downwind leg on to final. He stated that the upper aircraft was slightly behind the lower plane. A third witness (a pilot) who also observed the two airplanes positioned one above the other said that the lower airplane appeared to be at a lower-than-normal altitude for the base leg.

Examination of the crashed airplane disclosed that one communications radio was tuned to UNICOM, but the switch was in the OFF position.

Since the same UNICOM frequency may be serving half a dozen or more airports within a receivable range, it is important to remember to preface your position reports with the name of your airport, and to give the number of the runway you are using. (Occasionally two airplanes will commence a takeoff run from opposite ends of the same strip at the same time.)

Pre-takeoff radio calls help avoid surprises at apparently inactive airports.

UNICOM is not intended as a substitute for FAA's Air Traffice Control System, and the operator has no authority to separate traffic or vector aircraft. The ground radio is most helpful when it is manned by an experienced pilot, perhaps the airport manager or a fixed base operator or instructor pilot; but at any given moment it could also be operated by a non-flying relative or employee of any of the above whose only connection with the airport is to serve hamburgers at the coffee shop or clean the restroom. You should not expect a flight service station type of briefing. What you can reasonably hope—and ask for—are simple items such as active runway, pattern direction, if not indicated, and traffic in the pattern. The reliability of the information you get is not as important as the fact that you are tuned into a radio frequency which other pilots flying the area are also likely to be listening to or speaking on.

The common UNICOM frequencies for uncontrolled airports are 122.7, 122.8 and 123.0. The frequency for a specific airport is shown on sectional charts (in boldface italics next to runway length—no listing usually means no UNICOM or that the frequency information was not made available to the cartographers). See also FAA's Airport/Facility Directory. Check the NOTAMs for frequency changes or additions.

At airports where there is no functioning UNICOM or at times when it does not function, pilots are advised to transmit their intentions over the radio "in the blind," even where no other aircraft activity can be seen. Continue to transmit position reports whether or not there is a response; someone with receiver-only capability may be listening—and watching. Transmit and listen on 122.9, the air-to-air frequency assigned to general aviation.

Some pilots feel a little ridiculous about broadcasting in the blind with no reply, but it is a very cheap form of insurance that could prevent a tragedy. It is uncanny how the most deserted-appearing airport can, on occasion, sprout wings, in the form of some weather-beaten taildragger that was hidden behind an outhouse. Pilots often like to find a semi-abandoned airport for practicing landings, which is a fine idea as long as you remember to keep looking out for other aircraft and continue to broadcast position reports.

Recently a student pilot based at Phoenix was out flying one afternoon when he found what appeared to be an ideally quiet airstrip in the desert about 50 miles west of the city. The only other aircraft in sight was a partially dismantled *Stearman* biplane with no landing gear. There was no smoke coming out of the chimney on the roof of the little shack near the strip; no cars or people; not even a dog. But the sod runway looked firm and even, and the tattered remnant of a windsock indicated light winds straight down the runway.

After inspecting the field from the air and getting no response on the UNICOM frequency, the pilot landed, looked in the shack, which was locked, and then began a series of touch and go landings. There was not a cloud—or another airplane—in the sky, for the next hour.

But at approximately 4:30 p.m. a Cessna *AgCat* which had been spraying alfalfa approached the strip and made a standard downwind entry to the pattern—apparently just as the green and white 150 was lifting off from a touch-and-go. By this time there were long shadows over the sagebrush, and the conspicuity of both aircraft was diminished.

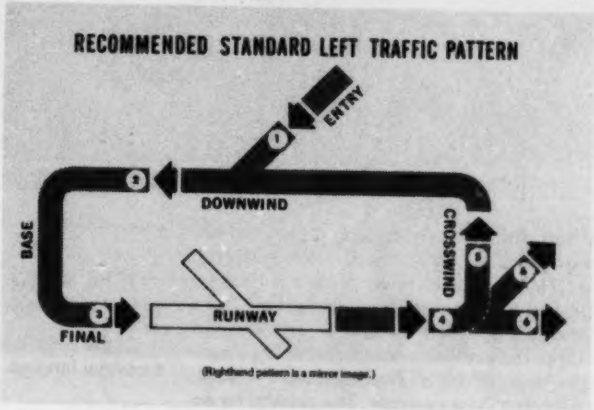
The student continued around the pattern at what he believed was normal pattern altitude but "could have been a little under." He stayed close to the runway with fairly short crosswind and downwind legs. The *AgCat* pilot made one radio call over 122.9 when turning base, and another when turning final, at which point his yellow biplane's landing gear struck the right wing of the *Cessna*, just inboard of the aileron. Both aircraft fell to the ground out of control. The *AgCat* pilot received only minor injuries; although his aircraft was demolished. The student pilot suffered a broken spinal vertabra. His statement indicated he had not used his radios at any point during his landing practice.

A pilot who is working to perfect a given maneuver, such as landing, tends to concentrate his attention on his performance and on the panel instruments, and he may neglect visual scanning. Radioed position reports are an important safety protection against the unexpected. In the accident cited above, neither pilot *expected* to encounter other traffic, but the cropduster knew enough not to rely on assumptions.

Position reports between aircraft, or air-to-ground, should be brief but explicit. Some details are important because the pattern legs at uncontrolled airports is not designed by FAA, and may vary according to local terrain, weather, aircraft type, and other factors. Some pilots habitually execute tight patterns, and others tend to swing wide. Some will make straight-in approaches. The straight-in approach is authorized for air carriers at an uncontrolled airport if it can be determined, through radio contact with a flight service station or radio operator at the ramp, that such an approach will not disrupt existing traffic. Using prominent landmarks in the report makes it easier for pilots to spot one another (". . . turning base near the red silo, turning final about half a mile out from the fence," etc.). It also eases matters for following aircraft when you give your color markings.

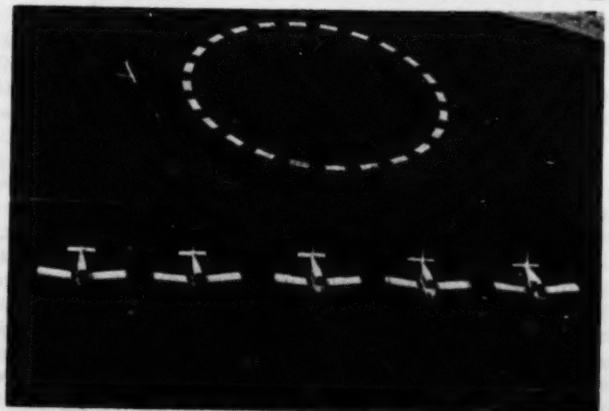
Orderly and safe traffic flow at uncontrolled airports is best assured when all pilots observe the standard traffic pattern and procedures recommended by FAA (unless indicated otherwise by airport officials). Recommended procedures include the following:

Figure 1.

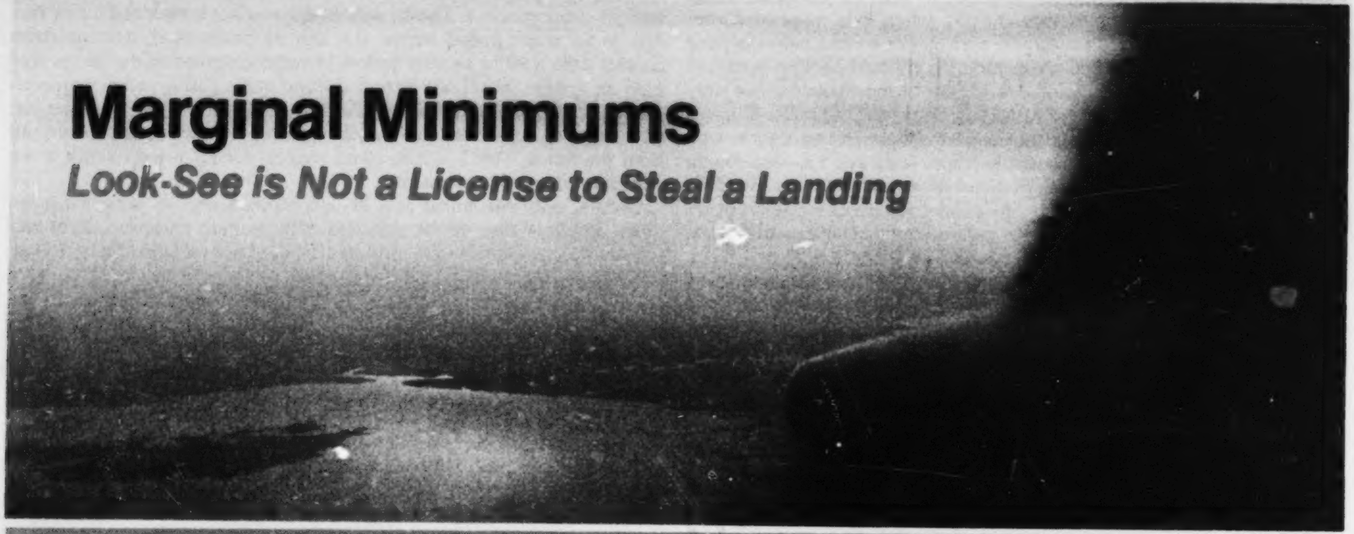

RECOMMENDED STANDARD LEFT TRAFFIC PATTERN
ENTRY
1
2
DOWNWIND
BASE
CROSSWIND
5
6
3
RUNWAY
4
6
FINAL
(Righthand pattern is a mirror image.)

Pattern Altitude 1,000 feet AGL

1. Enter pattern in level flight, abeam the midpoint of the runway, at pattern altitude.
2. Maintain pattern altitude until abeam approach end of the landing runway, on downwind leg.
3. Complete turn to the final at least 1/4 mile from runway.
4. Continue straight ahead until beyond departure end of runway.
5. If remaining in the traffic pattern, commence to turn to crosswind leg beyond the departure end of the runway, within 300 feet of pattern altitude.
6. If departing the traffic pattern, continue straight out, or exit with a 45° left turn beyond the departure end of the runway, after reaching pattern altitude.
7. Note: It is important to level your wings after making 90° turns so as not to block out any traffic from your sight. ☐



Flashing amber light in segmented circle means righthand pattern.



Marginal Minimums

Look-See is Not a License to Steal a Landing

When pilots talk about stealing they do not always mean taking someone else's property. What they sometimes have in mind is taking a chance with their own or other persons' lives by attempting flight in weather when the cloud ceiling or the visibility is less than the legal minimums required for a given operation—"stealing a landing," for example. The penalty for an unsuccessful theft of this kind is very high, quite apart from FAA enforcement procedures. *Over half of the accidents that result from landings attempted with below-legal minimums have fatal consequences.*

A few pilots may brag about what they have been able to get away with, but they are playing a dangerous game—with loaded dice.

Sometimes pride is a factor—an unwillingness to admit one's inability to cope with the weather; sometimes it is sheer refusal to accept the rules as a necessary protective measure. It is not simply a question of experience. Most pilots who crash attempting a landing in weather that is below landing minimums have at least 1,000 hours of flight time and considerable instrument time.

A study of approach/landing accidents in general aviation over a four-year period (1974 through 1977) identified 99 accidents where below minimum operations were a major factor. About two-thirds of these accidents were of a "look-see" nature—the pilot initiating his approach in the absence of on-site weather data or when the weather at the destination airport was reported to be below landing minimums. While look-see is prohibited to air carriers or air taxi aircraft in the United States, it is a perfectly legal procedure for general aviation under Part 91. This is an inherently safe operation when carried out in accordance with the regulations. By the time the aircraft reaches the decision height (on a precision approach) or the missed approach point (on a non-precision approach) the pilot is required to discontinue the approach unless:

---

(1) he has the runway environment clearly and continuously in sight; and

(2) the aircraft is now in a position to execute a normal landing.

At this point *judgement*, as well as experience and skill, is an important factor. The decision height or the minimum descent altitude and the location of the missed approach point (MAP) are determined for the pilot by FAA and are printed on the instrument approach chart for each airport. Separation from other IFR traffic is established for him through the approach clearance issued by air traffic control, but, of course, an ATC clearance is *never to be interpreted as approving the pilot's qualifications to land under existing weather conditions*. The decision to land or execute a missed approach is made in the cockpit, and this is where the trouble can begin, if the pilot decides to try "bending" the rules or mistakenly busts a minimum.

Apparently the temptation to land at the destination airport, even when this requires a little cheating, is difficult for some pilots to resist. The desire to avoid the inconveniences of an unscheduled landing at an alternate airport and perhaps an overnight stay away from home or a lengthy overland journey, frequently outweighs cold, hard facts. The eye imagines an opening in the clouds just below or ahead; the look-see is extended beyond the legal point by 50 or 100 feet and then another 50, and then—boom!

The safety margin of weather minimums for instrument approaches is not as generous as many pilots imagine. Some pilots entertain the erroneous notion that something like a 50% safety factor is added to all approach minimums, and that if you know the area you can shave the minimum considerably with no harm done—assuming you are unobserved.

Accident files show that most "stolen landings" take place at airports without control towers or at hours when the tower is not functioning. Thirty-eight of the 42 "below minimums" landing accidents reported by the National Transportation Safety Board for the 1977–1978 period occurred at non-controlled airports. In fact, 28 of these accidents occurred following a landing attempt without any ground radio contact at the destination point, such as UNICOM. In many cases the pilot apparently felt he knew the airport surroundings well enough to "feel" his way down without regard for the existing ceiling or visibility. In 35 of these 42 accidents the pilot was alone in the cockpit—with no one to assist him in continuing the approach under marginal conditions.

Single-pilot IFR, even for a look-see approach, can be perfectly safe as long as the pilot does not add to his normal burdens by delaying his go-around beyond the missed approach point, or by not preparing himself sufficiently in advance to execute this maneuver in accordance with the charts. With no one to call out altitudes for him, the pilot who does not have his airport clearly in sight well before reaching the MAP may become so wrapped up in trying to make out runway indications that he could slide far below his altitude minimum inadvertently.

A case in point involved a Beech 99 attempting to land at Bar Harbor in Maine. Bar Harbor is on the northern coast of New England, an area known for frequent morning fogs and low clouds. Hancock County-Bar Harbor Airport is located at the water's edge, directly across from the large island which includes Bar Harbor. It is approximately 33 miles southeast of Bangor and 189 miles northeast of Boston. The airport has two intersecting runways, with a localizer and a non-directional beacon approach to runway 22.

The 34-year old pilot of the Twin Beech Turboprop held an ATP certificate and had logged over 9,700 hours, including 2,500 hours in the aircraft he was flying that morning. As director of operations for a commuter airline, he was carrying out a short ferry flight from Bangor to Bar Harbor in order to position the aircraft for the day's flying schedule. There were no passengers or other crewmembers on board.

Departure from Bangor International Airport was at 6:13 a.m. on an IFR flight plan filed with Bangor Control Tower. The flight was cleared for the short hop at a cruising altitude of 4,000 feet, and the pilot was advised to report and hold at Surrey. (Surrey is a non-directional beacon used as the initial approach fix for the localizer approach to Hancock-Bar Harbor Airport.)

A clearance to begin the approach was radioed by Approach Control at Bangor Tower at 6:30 a.m.

The pilot replied, "Okay, we're out of four and we're inbound to Surrey on the procedure turn right. We'd like to shoot it straight in if we could."

Bangor transmitted approval.

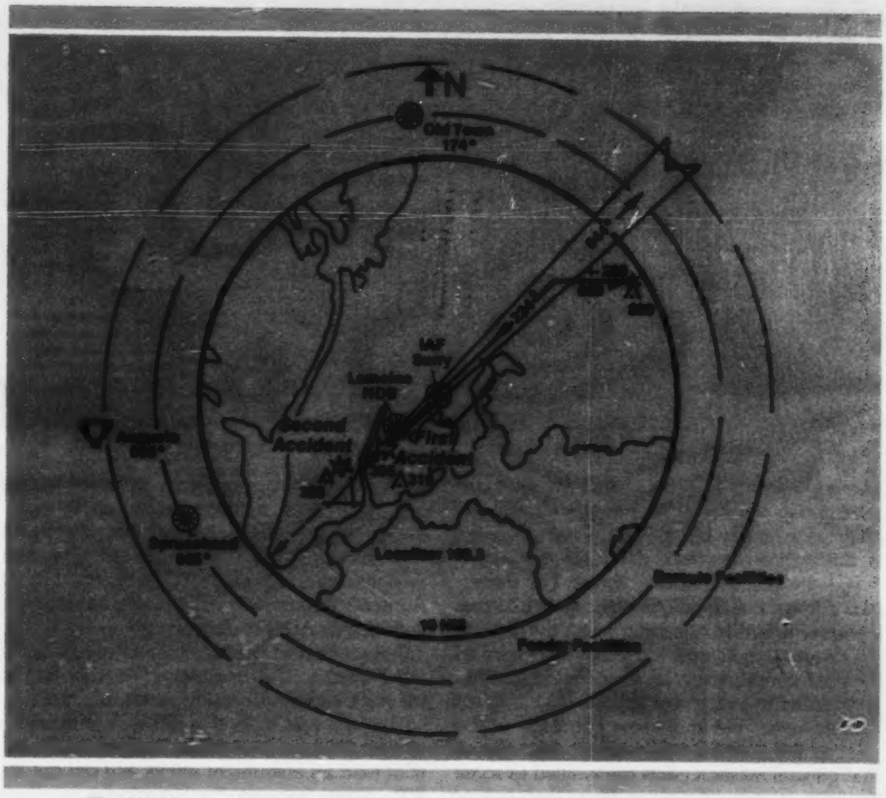
NAVAIDs for this approach consisted of the beacon at Surrey, 5.4 miles from runway 22's threshold, and a localizer situated beyond the departure end of the runway. A second non-directional beacon, "Lemoine," is located slightly west of the approach path and approximately two miles from the threshold, but Lemoine is not part of the localizer approach. The landing minimums for the straight-in approach in a Beech-99 were 580–1 (580 feet MSL, one mile visibility) when the Bar Harbor altimeter setting is available.

At 6:35 a.m. Bar Harbor weather was provided the pilot by a certified weather observer—an employee of the commuter airline: *Estimated 600 overcast, visibility one and one-half miles, fog, wind 190 at four, temperature 64 degrees, altimeter setting 29.82.* The airport elevation at Bar Harbor is 84 feet. The terrain is open and fairly level except for several small wooded knolls about 200 feet high.

According to the pilot's later statement, as reported by National Transportation Safety Board investigators, he passed Surrey NDB at 3,200 feet and leveled east of Lemoine at about 900 feet. Aircraft airspeed was reduced to 130 knots, and the gear was lowered. The pilot stated: "I resumed descent. Passed Lemoine NDB at 650 feet MSL, which was *last altitude observed* (Italics added). Less than five seconds later I came in contact with trees on top of a ridge."

The aircraft had crashed into a clump of trees atop of a 200-foot knoll, about one and three-quarters of a mile from the runway threshold. Luckily the impact had taken place on the backside of the hill, allowing the airplane to cut a path through the trees for a distance of 325 feet before coming to a rest. Although the plane was demolished, the pilot was able to walk away.

The weather preceding this accident was marginal. The pilot had the option, since the ferry flight was a Part 91 operation, to initiate the approach and have a look-see. But an *estimated* ceiling can be off the mark by 100 feet easily, and his own statement indicated that he descended through the minimum descent altitude without having the airport in sight.



The Bar Harbor VOR approach (Lemoine NDB added) and the two accidents sites.

(NOTE: This representation is not suitable for any navigational purpose.)

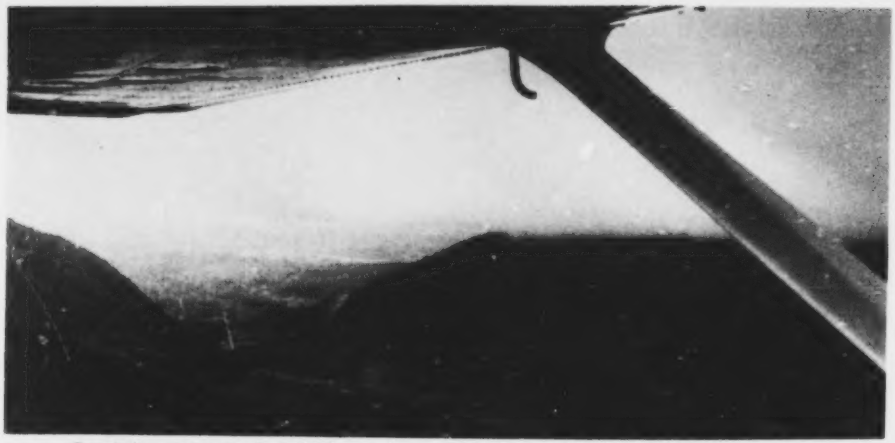
Furthermore, the pilot's statement indicated that at the time he descended below the minimum descent altitude he was in a high rate of descent, which would have made it difficult to complete a normal approach and landing, as required by regulations. Many instrument approaches, such as the localizer approach to Bar Harbor, have the missed approach point close to the threshold. With certain aircraft, and under certain wind conditions, if the pilot waits until he actually reaches the MAP before beginning his landing descent he may have to steepen his approach angle abnormally, perhaps resulting in an unsafe landing. In accordance with FAR Part 91.117, pilots are expected to discontinue the approach not only at the MAP or decision height, but at *any point in the approach when they are not certain that they can carry out a normally configured final descent.* The recent introduction of VDP, or visual decent point, was intended to help pilots realize they had reached the point at which final descent would normally be initiated, even though the MAP may be some distance off. VDP is a voluntary NAVAID and not available at all airports with instrument approaches, but many seasoned pilots use their own version of a VDP and initiate a missed approach whenever they perceive a possibility of overshooting the landing.

There is always the possibility of a mechanical failure or freakish weather condition occurring on final approach. The pilot who cuts his safety margin too thin and then finds himself beset with unexpected distractions could easily lose control of the aircraft or wander off course with calamitous results.

Something of this nature happened to the Beech 99 pilot two years after his first accident at Bar Harbor. Still chief pilot, he and another pilot were flying two company executives into Bar Harbor one foggy evening in May, again under marginal weather conditions. They had departed Bangor in a Cessna 402, when the measured ceiling was reported as 700 feet, with 1,000 feet overcast, visibility three miles in light drizzle and fog. At Bar Harbor the company weather observer estimated the ceiling as 600 feet overcast, visibility one mile in rain and fog.

Shortly after beginning the localizer approach to runway 22, the aircraft disappeared from the Bangor Approach Control radar screen. The 402 crashed one mile west of the airport and burned. There were no survivors. There had been no radio transmissions indicating trouble with the airplane, and no evidence of mechanical failure was found. But witnesses reported the aircraft as maneuvering at some length at a very low altitude, and the righthand propeller had been feathered. The Safety Board, once again, listed improper IFR operations as a probable cause of the accident.

The look-see privilege for instrument approaches has been criticized in some sectors as



Good airport approach visibility can be abruptly obscured by fast-moving ground fog.

opening the door to illegal operations, or at best putting into the hands of the pilot a responsibility he may not be able to carry out. *When is the runway environment clearly in sight? When can you see runway lights? The threshold? Airport buildings? An adjacent site? What if you see ground fog moving across the airport?*

Obviously individual judgement will vary as to what constitutes a legal and safe weather condition for any given approach in a given aircraft—even the immediate condition of the pilot at the controls is a factor. FAA believes that general aviation pilots are entitled to some flexibility in these decisions. More than half of the 1,727 airports in this country with instrument approaches have no weather reporting facility, and therefore could not be used by Part 91 operators in IFR weather if they were not entitled to a look-see.

General aviation pilots have traditionally been given a certain amount of leeway in flight operations. Normally they have their own best interests in mind and will not knowingly expose themselves to hazards by ignoring weather minimums. But weather conditions on an IFR approach can change suddenly and are often deceptive. Look-see means just that—a look at the weather conditions at the airport—it is not a back door around prescribed minimums. Abuse of the look-see could lead to a higher accident rate and possibly the loss of the privilege.

Various kinds of automatic weather recording equipment now under development and testing may in time offer pilots an additional means of determining whether a safe landing can be made at an airport that does not have a manned weather station. The automatic equipment transmits frequent or continuous observations, either over the VOR frequency or over a discreet frequency.

Eventual mass production should bring the price of automatic weather reporting systems within the budget of many general aviation airports and may result in lowering weather minimums for certain approaches.

The National Weather Sevice has installed AUTOB, a new automatic weather observing station at Fort Yukon, Summit and Unalaklett, Ak.; Del Rio, Tex.; Sandberg, Ca.; Wendover, Ut.; and Winslow, Az. There are some important differences in the means used by automated devices to observe weather, compared with human observors, which effect weather analysis and understanding. See the current Airman's Information Manual for an explanation of how AUTOB functions.

Approaches in below minimum weather are not limited to IFR operations. At least half of the accidents in the study previously cited involved attempts to land in IFR weather without using instrument procedures. In many cases the pilot held an instrument rating, but did not file IFR—either because the airport did not have an instrument approach, or because the pilot simply did not trouble to use the instrument approach and seek a clearance.

Just how many landings are "stolen" each year under these conditions is anyone's guess. Again, all we know for certain is that more than half of the accidents resulting from unsuccessful efforts to land in below-minimums weather are fatal. A typical VFR-in-IFR conditions accident occurred in Oak Ridge, La., on a recent foggy September night, bringing a sad climax to a holiday in Baton Rouge.

Five men, including three rated pilots, had flown to Baton Rouge early in the day in a Piper *Cherokee*, departing from a sod strip known as Barham, or Oak Ridge. Barham is a private strip with a single runway, 35–17, 2,000 feet long, in the middle of a cotton field, with runway lights and a simplified VASI (non-approved). It is a cropdusting base, with hangars and an operations office. The field is broad and open, with a row of trees about 1,000 feet on either side of the runway.

According to the National Transportation Safety Board report, the five men had flown the 150 miles to Baton Rouge to attend a football game, relax and have dinner in town. At 10:30 that evening the group returned to their airplane at Baton Rouge, called the tower for taxi instructions, and were cleared for takeoff a few minutes later. According to one passenger (the only survivor) the co-pilot had obtained a weather briefing by radio and told them "VFR weather was reported en route and radar indicated no en route weather problems." However, the FSS had no record of briefing this aircraft or providing weather information for a flight to Monroe at this time of night. Departure radar contact was terminated at 11:00 p.m., and the flight continued by way of Monroe VOR. (Monroe is located approximately 17 miles southwest of Barham.)

The terminal forecast for Monroe at midnight was *3,000 feet scattered variable broken, chance of thunderstorms*. However, the Monroe surface observations for 12:00 a.m. noted, *thin obscuration, visibility one and one-half miles*. . . . At 11:39 the *Cherokee* contacted Monroe Approach Control and was given the altimeter setting and wind information. Thirteen minutes later the aircraft crew reported their position as over Bayville (about eight miles south of Barham), and descending through 1,500 feet.

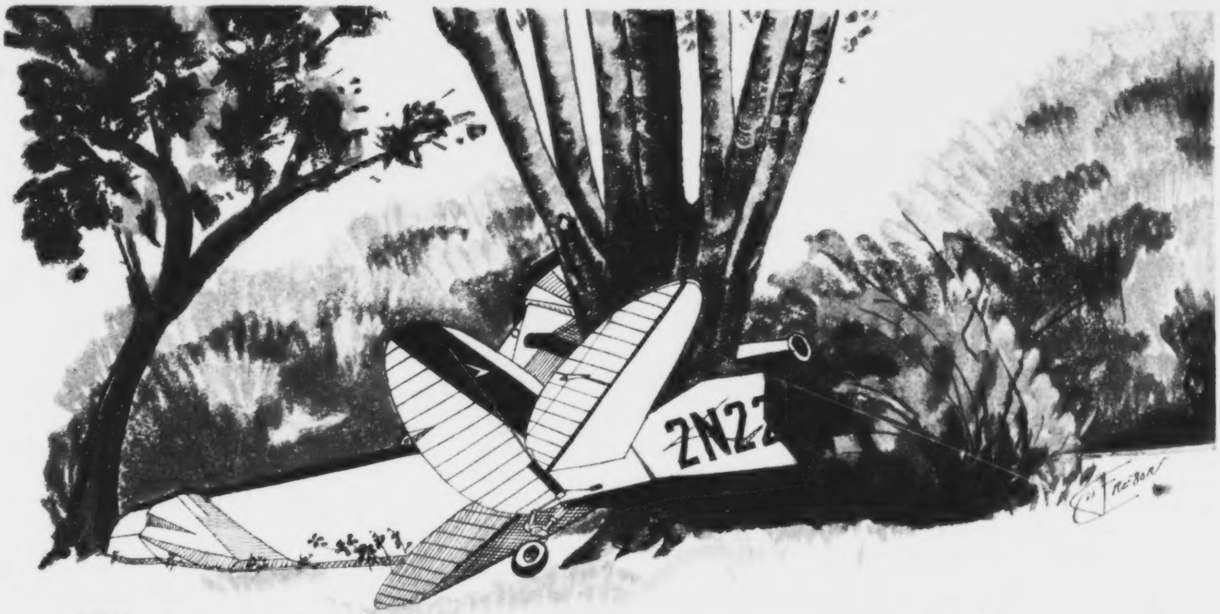
Final approach was normal, according to the surviving passenger, who stated that he could see the runway lights flashing by as the airplane rounded for the touchdown. However, just before the wheels touched the pilot said, "Let's get out of here!" He applied full power and began a go-around.

A few seconds later the *Cherokee*'s wing struck a tree to the left of the runway and slammed into the ground. There was no fire, but the crash was fatal to four of the five persons on board.

One observer at the scene theorized that the runway may have become obscured with fog at the instant of touchdown, and during the attempted go-around the airplane yawed off to the left because of uncorrected high torque. The airport manager, who was driving a truck near Barham at the time of the accident, testified that forward visibility at the surface was restricted "in the neighborhood of 300 feet because of the ground fog." He said he could not drive more than 15-20 mph. The accident investigation determined that this was a below minimums operation and noted that the weather was considerably worse than forecast.

No matter how good an approach looks at the start, VFR or IFR, bear in mind that cloud configurations are constantly changing and can wipe out your visibility abruptly. Ground fog is often very difficult to spot from the air at night. Never expect conditions at your destination to correspond exactly to weather reported 10 or 20 miles away. Remember, too, that altimeter settings can vary a few miles apart, under unusual weather conditions or in mountainous terrain.

Even an unofficial weather observation is usually better than none at all. Check with air traffic control for PIREPs, and if your destination airport has an active UNICOM, get what information you can from this source. If nothing is available, and conditions appear marginal or you are landing at night, you might want to consider landing first at the nearest controlled airport, telephoning a pilot friend who lives near the destination airport or the field's manager. Proceed only on very tangible reports and with caution. A look-see in the dark that discloses the presence of any nearby clouds is a pretty strong signal for you to go somewhere else in a hurry. In the words of one old-timer, "When in doubt, get the hell out." ☐



Not Quite as Good as I Thought

Takeoff . . .
Weather *not quite* as good as I thought.
It isn't *that* bad though . . .
It *could* get better.
It *should* get better.
It *has* to get better.
It *isn't* getting better . . .
It *could* be worse.
It *is* getting worse . . .
It's BAD!
It's very *bad*—no horizon.
It's *really* bad—the ground is gone!
I don't believe I'm in this . . .
I don't want to be in this!
SOMEONE GET ME OUT OF THIS!
There is no one to get me out of this . . .
Grey everywhere!
The engine is speeding up . . .
Pull back!! Go up!!
The altimeter is going the wrong way!?
Compass and gyro spinning . . .
Got to go the other way—which way?
Airspeed redline!?
Airplane SCREAMING!!!
There in the grey . . .
Black trees leaning *down* above my nose!?
I'm going up into them . . .
Big snow mounds . . . undergrowth . . . fallen
branches . . . chewed up by the prop . . .
I shouldn't . . . . . .

Text by John V. Graff, National Weather Service.
Drawing by Carl L. Freson.

Ground Resonance

Unbalanced Rotors Can Give You a Fit

"Helicopters are different from airplanes," as a network newscaster once explained. "Not better or worse, just different."

Very true. Helicopters have certain idiosyncrasies, one of which includes throwing a self-destructive fit, under certain conditions of neglect and mismanagement. Technically known as "ground resonance," this is a phenomenon which can literally shake some helicopters apart.

Unrelated to ground effect, ground resonance is a violent interaction between a fully articulated helicopter and the terrain, which may take place under varying circumstances of takeoff and landing. When it occurs, the helicopter will begin to vibrate excessively, rocking on its landing gear so rapidly and violently that the pilot may be unable to take corrective action in time to avoid destruction of the helicopter. He is not likely to have any previous experience with ground resonance, except in discussions with an instructor or other pilots, and may not recognize what is happening until it is all over. The occurrence is infrequent, and to a large extent preventable.

Ground resonance will occur only to helicopters with fully articulated rotor systems, whose blades (usually 3 or 5) are free to move forward and backward and up and down, in addition to changing pitch. Dampers (or dampeners), a hydraulic or mechanical device similar in principle to a shock absorber, are designed to keep the blades from leading or lagging excessively. If the dampers malfunction, an unbalanced rotor condition may occur and could cause the helicopter to oscillate. Ground resonance is most likely to occur when the oscillating helicopter makes *uneven* gear contact—one gear touching the ground and the other still in the air—or lands on defective oleo struts. The result is the immediate dispersal of destructive vibrations throughout the airframe, and the helicopter destroys itself on the ground—a serious threat to life and property.

Recovery takes a quick reaction, since complete destruction can occur in a mere 30 seconds or less after the resonance begins. (Characteristically, because of its impact-resistant design, the cockpit area will remain structurally intact while everything else comes apart.) The pilot has two choices. He can attempt to become airborne or he can shut the engine down to stop the out-of-phase rotation, hopefully.

If ground resonance occurs on landing, there is usually enough rotor rpm to take off again, and once clear of the ground the resonance ceases. (However, since the continued presence of oscillations could create resonance again on a subsequent landing, a softer landing area which will absorb the vibration would be a good choice.) If the resonance problem begins on takeoff, there may not be enough rotor speed to become airborne, and since any attempt to increase rotor speed will increase resonance as well, engine shutdown is usually the best course of action.

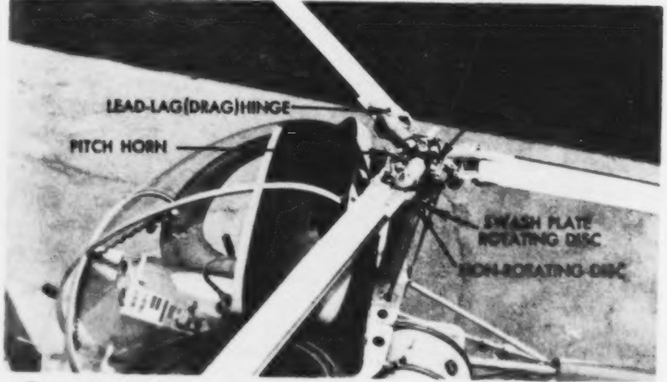
A fully articulated helicopter with malfunctioning rotor dampers is most susceptible to ground resonance if it has weak or unevenly extended landing gear shock absorbers. This promotes instability and the likelihood of uneven touchdowns when landing or taking off—as a pilot in Seattle, Wash. discovered recently to his grief.

He had noticed a low oleo strut on the rental helicopter he was about to fly, but accepted the owner's word that it only appeared uneven because of the slanting ramp. As he was preparing to take off the helicopter suddenly began to vibrate so violently that he was unable to reach the key in the panel switch and turn it off. The 'copter flopped around on the ramp as the rotor blades were distorted by contact and chewed up the fuselage. Although the cockpit remained intact, the pilot and his passenger were both hospitalized from bruises and back injuries.

Agricultural pilots who operate fully articulated helicopters from a flat bed truck are always a potential target for ground resonance. If the suspension system of the truck is too rigid to absorb any existing oscilations or too springy, so that the surface itself begins to vibrate with the helicopter, reinforcing its rocking motion, ground resonance may set in. Operating from ground which is very spongy or soft—as is often the case in springtime—can be hazardous for the same reason.

Pilot technique also plays a role in setting up conditions conducive to ground resonance. Any procedure which leads to prolonged single-point contact with the surface will certainly aggravate an oscillating condition—perhaps to the extent of producing ground resonance. This includes landing on a slope, hovering too low over uneven terrain, making run-on landings or takeoffs over rough ground, and raising the collective pitch too slowly or hesitantly on takeoff.

Good preventive maintenance is the key to avoiding the destructive experience of ground resonance. Insisting on proper inflation of oleo struts—and tires—is one good form of insurance. Another is the habit of checking damper action carefully by hand on every preflight, making sure that the rotors are not able to exceed a normal travel span. Full articulation of the rotors provides you with excellent helicopter performance capabilities, but trying to control the aircraft once ground resonance has started has been described as like "shaking hands with the devil." ☐



Components of the rotor dampeners on a fully articulated helicopter.

Famous **FLYERS**

Fairchild

and the Camera That Gave Birth to an Airplane

How would you like to be born with a legacy that would one day be worth half a billion dollars? Add to this brains, good looks, and family connections in politics and society that made you, as a college youth, the target of New York's most desirable debutantes? Talk about being born *free* . . . all Sherman Mills Fairchild had to do was ease back and enjoy life. For some strange reason he chose, instead, to devote himself passionately to aerial photography, and in the process manage to introduce a new dimension to aircraft design.

Born on April 7, 1896, in the village of Oneonta in central New York, Sherman was the son of a Congressman and publisher who eventually became chairman of the board of IBM, Inc. The boy grew up on a wealthy country estate surrounded with marvelous playful gadgets, like miniature trains that ran around the grounds—and few human companions. His father was frequently away on business, and both parents made extended visits to Europe. Young Sherman early developed the habit of taking everything mechanical apart to see how it worked, and how it could work better. He entered Harvard in 1915 but transferred to Arizona U. because of recurring tuberculosis.

By this time American entry into World War I was at hand, and Fairchild, who had become interested in aerial mapping, tried to enlist in the Army Signal Corps. Turned down because of his T.B. history, the enthusiastic youth volunteered to work on his own to improve the aerial camera. At this time aerial photos tended to be distorted and indistinct, because the focal plane shutters in use were too slow in relation to the speed of the airplane moving over the target. No one had yet been able to design a successful between-the-lens shutter for aerial cameras.

With military blessing, Fairchild borrowed $40,000 and some facilities from his father and went to work. Eighteen months later he proudly displayed his new model, in which the shutter was inserted between the lens components, thus admitting more light during shorter exposures.

Other advanced features included an electrical film advancer and an "intervalemeter," a means of taking pictures at selected intervals. This Fairchild camera was destined to revolutionize aerial mapping, for civilian as well as military use. But in late 1919, a year after the war was over, a lean-budgeted Army was no longer interested in cameras and eventually paid for less than a fourth of the development costs.

In the fall of 1919, Fairchild entered Columbia University in New York City to continue studying engineering. He liked his studies, enjoyed living in the big city, listening to jazz and attending Broadway shows with a charming debutante on his arm. But he also wanted to prove the value of his camera, and early the following year he dropped out of college and formed the Fairchild Camera Corporation with $25,000 in assets.

Working with two associates, one a photographic engineer, Fairchild perfected his K–3 aerial camera and demonstrated it impressively for the Army Air Service. Within a year he had orders for 20 production units. He still lost money on the deal, but confidently expanded his company to a half-million dollar capitalization with some 40 employees—becoming the world's leading manufacturer of aerial cameras by 1923.

By this time Fairchild, who characterized himself as "half inventor and half entrepreneur," had opened up a vast commercial market for his cameras, pointing out the advantages of aerial mapping for city governments (who were able to tax hitherto unknown and unregistered property), real estate developers, highway and pipeline engineers, mining and agricultural interests, etc.

The company acquired several airplanes to take pictures, but Fairchild considered them all unsatisfactory. An aerial platform was needed, he felt, that did not expose the cameraman to wind and cold or buffet him about, shut off part of his view, produce excessive vibrations, or force him to land frequently for fuel. Pilot discomfort had long been considered a necessary condition of flight, which added to its heroic status, but Fairchild had no patience with sentimental or romantic images.

Determined at last to solve these problems for himself, he experimented by modifying several existing aircraft, adding more window glass, a "cabin" enclosure, openings in the floor for camera emplacement, and extra fuel tanks. After learning all he could from other designers he formed his own aircraft manufacturing company in August of 1925. His design goals included: greatly expanded visibility, high service ceiling, stability in turbulence, small field operation, long range cabin comfort, and ski/float conversion.

In June of 1926 the prototype FC-1, flown at New York's Roosevelt Field on Long Island, met all of these objectives. In addition, its semi-cantilevered high wing could be folded back, reducing the span from 44′ to 13′. In the improved FC–2 version it was powered by a Wright J–5 220 hp engine and weighed 3,225 lbs., with a useful load of 760 lbs. The roomy, heated cabin held four persons, plus pilot and baggage. Top speed was 119 mph, range 710 mi., service ceiling 14,750 feet.

The Fairchild aircraft was an immediate success, proving eminently suitable not only for aerial photography but also for carrying passengers and freight, for exploratory and patrol work, for advertising, and for dozens of other purposes no one had previously imagined. The age of the unstable open-seater was over. Orders poured in from all over the country and the continent, as fledgling airlines and air taxi companies mushroomed overnight.

From this success Fairchild went on to design some 50 aircraft in a career that spanned over a half century in aviation. Famous designs included the Fairchild 71, a six passenger plane with remarkable durability, built specially for bush flying; and the PT–19, a primary military trainer that was turned out by the thousands during World War II. Never a pilot himself, and despite little formal training, he exhibited a remarkable ability to "make things work" in aviation—to solve problems by approaching them directly and in complete confidence. ". . . never mind all the people who say you can't do it; just go ahead and figure out a way." His lively mind led him into many allied fields, such as avionics, semi-conductor technology, and aerospace for which he founded numerous new companies, but air-mapping remained a lifelong interest.

Fairchild never married and apparently never took a vacation, seeking his recreative inspiration in new undertakings, new challenges. Ideas apparently interested him more than people. Still chairman of Fairchild Camera and Instrument Corp. and Fairchild Industries when he died in 1971, at the age of 74, he had no relatives and his estate was divided between faithful associates and a foundation for scientific education. ☐

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"AM WEATHER" EXPLAINED. The nationally televised program "AM Weather," which provides current and forecast weather information for airmen, has published a revised 24-page guide for interpreting the symbols and shading used in the daily weather program. Shown in the early mornings on 218 public broadcasting stations, "AM Weather" offers the national and regional weather picture, presented by National Weather Service meteorologists using PBS satelline photographs. The booklet is available for $1.00 from the Maryland Center For Public Broadcasting, Owings Mills, Md. 21117.

UNICOM Frequencies Changed at Fifteen Airport Areas

Over the next six to 12 months, UNICOM operators at uncontrolled airports in 15 areas in the United States will be changing frequencies according to an assignment plan developed by FAA and the Federal Communications Commission. (There are now three UNICOM frequencies available for assignment to uncontrolled airports: 122.7, 122.8, and 123.0.) The assignments are expected to reduce the number of uncontrolled airports using the same UNICOM frequency within the same reception area.

The areas scheduled for frequency reassignment are: New York/New Jersey; Washington, DC/Maryland/Virginia; Atlanta; Chicago/Milwaukee; Cleveland; Los Angeles; Denver; Cincinnati/Dayton/Columbus; Seattle; Detroit/Toledo; Indianapolis; Houston; Dallas/Ft. Worth; Pittsburgh; and Boston. Pilots are advised to check directly with airports or with their associated Flight Service Station for the current frequency, since the Airport/Facility Directory and aeronautical chart information will lag behind the changes during the transition period.

UNICOM operators not affected by the assignment plan who are encountering frequency congestion can change to one of the other two frequencies upon request to FCC.

(See "Position Reports" on p. 6 of this issue for a related article.)

Pilots Cautioned on Quinine

The Armed Forces Institute of Pathology has cautioned pilots against intake of quinine in any form, including quinine and tonic water drinks, until studies can be completed to determine if it is harmful to a pilot's sense of equilibrium. Accumulation of quinine in the fluid of the inner ear has been associated with disorientation.

The Institute began its clinical studies after an autopsy of a pilot killed in a recent crash revealed quantities of quinine in his tissues, and further investigation showed the pilot drank large quantities of tonic water daily.

More Flight Experience Required For Commuter Pilots

Under new FAR 135.244, as of March 1, 1980 the pilot-in-command of any aircraft with a two-man crew, carrying passengers for hire, must have logged from 10 to 25 hours of flight time in that make and model airplane under the supervision of a qualified check pilot. The flight time required is based upon aircraft complexity: from ten hours for single-engine piston aircraft, ranging up to 25 hours for high-performance turbojets.

The new requirements, enacted as an emergency amendment to FAR Part 135, are intended to bring experience levels for commuter pilots more in line with those for certificated air carriers. Although the rule change became effective upon its announcement, public comments are being accepted until April 1, 1980.

The rule change was prompted by a study of 4 of 13 fatal commuter accidents in 1979 which indicated that the pilots involved, although high in total flight time, had as little as two hours flight experience in the make and model airplane they were flying at the time of the accident. Twenty-five people were killed in these four accidents alone.

Additionally, the rule revised FAR Part 135.105 to require that the pilot-in-command of a commuter aircraft approved for single-pilot, passenger-carrying operations with the aid of an autopilot must have a minimum of 100 hours of flight time in that make and model airplane before passengers can be carried for hire.

Petition on Pesticides

The *Friends of the Earth*, a national environmental group, has petitioned FAA to begin rulemaking procedures to amend FAR 137 concerning aerial application of pesticides. (The Environmental Protection Agency has also been petitioned to change its policies and procedures regarding labeling and enforcement activities in aerial application of pesticides.) *Friends of the Earth* is seeking to prevent inadvertent contamination of areas adjoining application sites. FAA has asked for public comment on the petition by April 17, 1980.

Current FAR Part 137 regulations concerning pesticides apply primarily to aircraft and pilot qualifications, but they also require that pesticides be applied in such a manner as to avoid hazards to people and property.

Friends of the Earth wants regulatory changes which would require pilots to obtain written permission before spraying within 1,000 feet of a person or property not included in the spray contract, written testing of aerial applicators before they can go into business, and an increase in the size of aircraft registration numbers so that violators can be turned in.

Comments should be sent to FAA, Chief Counsel, AGC-24, Docket No. 19448, 800 Independence Ave., S.W., Washington, DC, 20591. Copies of the petition are available from FAA, APA-430, same street address.

• Over-Eager ELT

I was flying in calm air recently when my ELT suddenly triggered for no apparent reason, swamping the whole VHF band and making ATC communications impossible. This is not healthy, especially in congested areas or instrument conditions. Question: Are there regulations governing ELT transmitting bandwidth? If so, are they under the jurisdiction of FAA or FCC?

Alfred B. Chan
San Mateo, CA

OFF
ON OFF
ARM

Regulations governing ELT specifications are found in FAR 37.200. The ELT is required to transmit only on the emergency frequencies—121.5 MHz civilian and 243.5 MHz military. The inadvertant transmission may have garbled your ability to receive while other aircraft were not affected.

Every civilian transmitter in the U.S. comes under the direction of the FCC, but in the case of ELT's, FAA and FCC have joint jurisdiction.

If the remote switch was not inadvertantly turned on, that ELT needs a quick checkup. (See photo.)

• Survival Training for Pilots

I was very interested in your article on "Post Crash Survival" in the Nov/Dec 1979 issue. No matter how safe we are as pilots, accidents are still going to happen, and since not all of us are Eagle Scouts, we could use survival training even if it were never personally needed. Does FAA sponsor any survival training seminars similar to the safety seminars of the Accident Prevention Program?

June Hanson
Edgewood, MD 21040

Some FAA district offices in the mountain or desert areas and in the Pacific and Alaskan regions sponsor pilot survival training sessions periodically. Contact the office in your area for the nearest program.

• The Black Foothills?

I enjoyed "Appalachian Scud Running" (July/August 1979) also, but on the Cheyenne Sectional I found Harney Peak at 7,242 feet and Bear Mountain nearby at 7,240 feet, both of which are taller than Mt. Mitchell, allegedly tallest outside the Rockies.

Robert Henry
Newcastle, WY

Harney Peak and Bear Mountain are part of what is popularly known as the Black Hills, usually considered part of the Rocky Mountain "foothills."

Suppose we say Mt. Mitchell at 6,684 feet is the highest peak east of the Mississippi River?

• Engine Extinguishers

The airplane used for aerial photography for my company recently underwent the following experience: After refueling at our local base of operations, as the pilot started the engine to taxi away from the fuel pumps, an exhaust fire started. The pilot shut everything down correctly, and a line-boy used a dry chemical extinguisher to put out the fire that had spread over the cowling. During subsequent repairs a few days later, it was found that chemical corrosion had begun almost immediately. Engine mounts, parts, inside the cowl, and cowl flap hinges were all affected, and we are wondering if any chemical from the extinguisher was sucked into the engine intake.

We have tried every cleaning procedure recommended but the corrosion keep spreading, necessitating continual replacement of affected parts. We didn't realize that the chemical should have been cleaned off immediately (or within 12 hours). The cost of repairs and the downtime of the aircraft has been very expensive, and I just wanted to warn others about corrosion from dry chemical fire extinguishers.

Joseph A. Dileo
Silver Spring, MD

Thanks for a word from the wise. The chemical manufacturer may be able to suggest the best way to remove harmful residue so that continuing repairs can be avoided.

• Measuring Flight Time

Regarding the letter on "Tach Time or Hobbs Time?" in the Nov/Dec 1979 "Forum" the oil pressure actuated Hobbs meter on my airplane registers 20% less than an electonic timing device activated by an air switch—which always registers the same elapsed time as my wrist watch. Which should be used to measure "block to block" time?

Irving M. Fogel
New York, NY

Regulations refer to flight time as "block to block" time but do not specify how to measure it. Use whichever way you wish.

• Density Altitude, Personal Oxygen

What I read in *General Aviation News* about density altitude (November/December 1979 "Forum") doesn't square with what I read in another publication. You say that the body responds to pressure altitude, not density altitude, but I read elsewhere that density altitude is what your personal oxygen system feels. How about telling us where your information came from and why the discrepancy?

James M. Thoburn
Rochester, NY

According to the Federal Air Surgeon, pressure altitude (not density altitude) affects human consumption of oxygen. The reduction of atmospheric pressure that occurs with increased altitude prevents oxygen from being "pushed" across lung membranes and into the blood when air is inhaled, leading to hypoxia at altitudes above 10,000 feet. But the density of the air has no effect on the pressure required to absorb oxygen. Density does affect aircraft, because it alters the fuel/air ratio and provides less lift (but also less drag).

• Gobbling the Gook

I wish to commend your publication on the clarity and simplicity of the English language that it has employed in *FAA General Aviation News*. It has provided me with reassurance that "administratese" has not infected all government writing.

David M. Simon
Princeton, NJ

The mission of this publication is to serve the aeronautical industry by elucidating and delineating various regulatory, technical, and operational nomenclature without superfluous verbiage and with a proclivity for the simplistic.

In other words, right on!

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Who's Counting?

I always look forward to reading *FAA General Aviation News*. However, all the questions lately about logging flight time got me wondering about some of these self-professed 35,000- and 40,000-hour pilots. For example, a pilot 53 years old who stated he had 40,000 hours: If he'd gotten his license at 15, he would have had to fly four hours every day for the last umpteen years, no time for vacations, no sickness, no unserviceable aircraft, no bad weather. It doesn't seem possible, does it?

John Doster
Allentown, PA

Flying 4 hours a day, everyday, you could accumulate 40,000 hours in about 28 years. An instrument rating would permit you to fly in all types of weather. For air carrier flying, of course, you are limited to 30 duty hours of flight within a span of seven consecutive days—a little more than four hours per day. For the retired airline caption, 30,000-plus hours is not an unusual claim, and such totals presumably could be authenticated by interested persons.

In general aviation, flight time is required to be logged only during instruction or in preparation for a certificate: All other time claims are as reliable as the pilot's integrity.

Anyone want to put in a claim for most hours?

• Estimating Cloud Bases

In "Ask the Weatherman" in the July/August 1979 issue, as I read the answer to the question on how to estimate the altitude of a cloud base, I was wondering whether it wouldn't be more advantageous to multiply the temperature/dewpoint spread by 400 to obtain the cloud base in feet or by 122 to obtain it in meters. Division of the spread value does not make sense to me.

Olaf-Georg Issinger
Stuttgart, Germany

Dividing by four gives you a more conservative figure. For example, 25° C temperature, 15° C dewpoint gives a spread of 10° C. Dividing by four gives 2.5 or 2,500 feet for the base of the clouds. Multiplying 10° C by 400 would give 4,000 feet. We prefer to take the lower value rather than run the risk of overestimating the bases and getting caught between the cloud and a hard place.

INSTRUMENT CORNER

• Missed Approach Point

The profile view of the ILS in the explanatory section of the Instrument Approach Procedure volume shows the Missed Approach Point (MAP) at the Middle Marker (MM), and for any given ILS approach the Missed Approach Track is shown as beginning here. Yet the small table on the approach plate beneath the airport diagram gives the distance from the Final Approach Fix to the Missed Approach Point as the distance from the FAF to the runway threshold. Which is the Missed Approach Point—the middle marker or runway threshold?

Dr. Cyril Toker
Potomac, MD

It depends. For an ILS approach, MAP is in the vicinity of the middle marker, and the distance shown in the table is from the outer marker to the middle marker. For an NDB, LOC, or VOR approach, the MAP is the runway threshold, and the distance in the table is from the FAF to the threshold.

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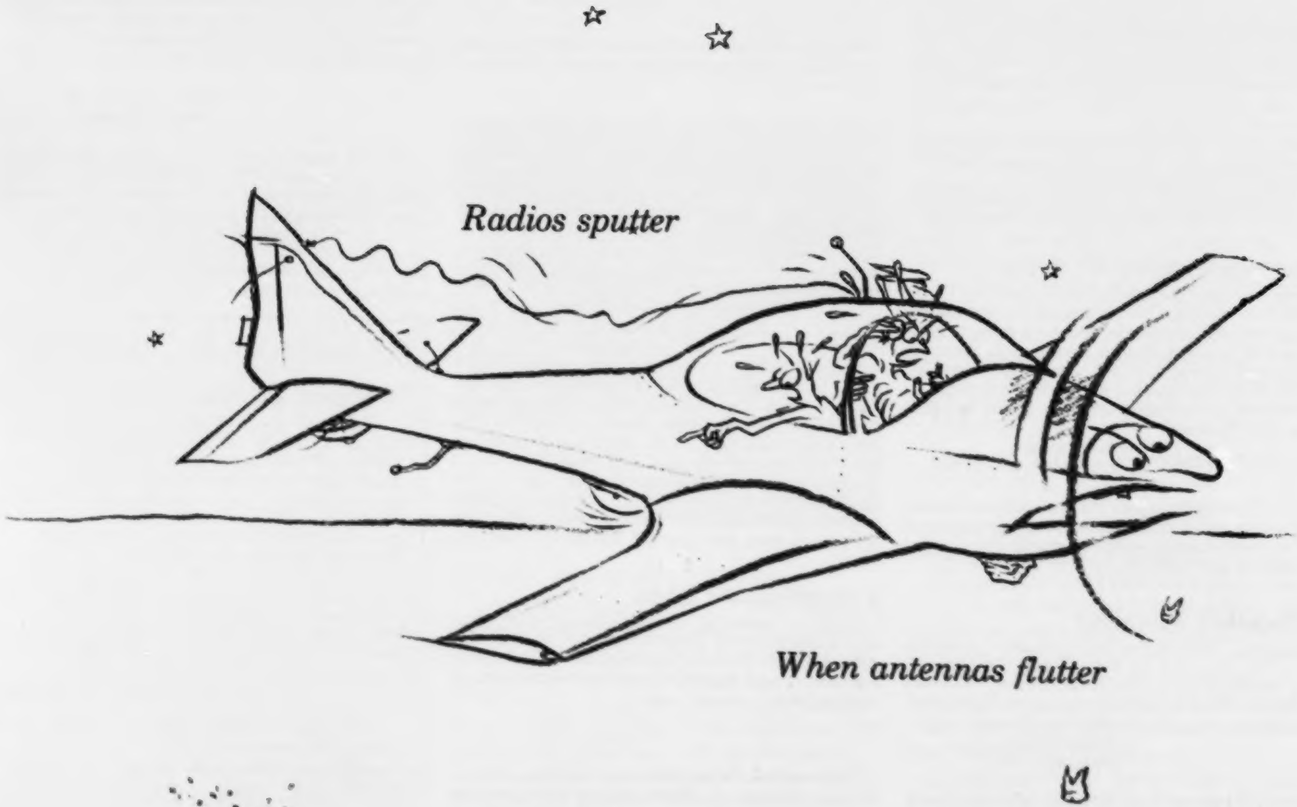

Radios sputter

When antennas flutter

19/3

FAA
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MAY-JUNE 1980
A DOT / FAA FLIGHT OPERATIONS SAFETY PUBLICATION

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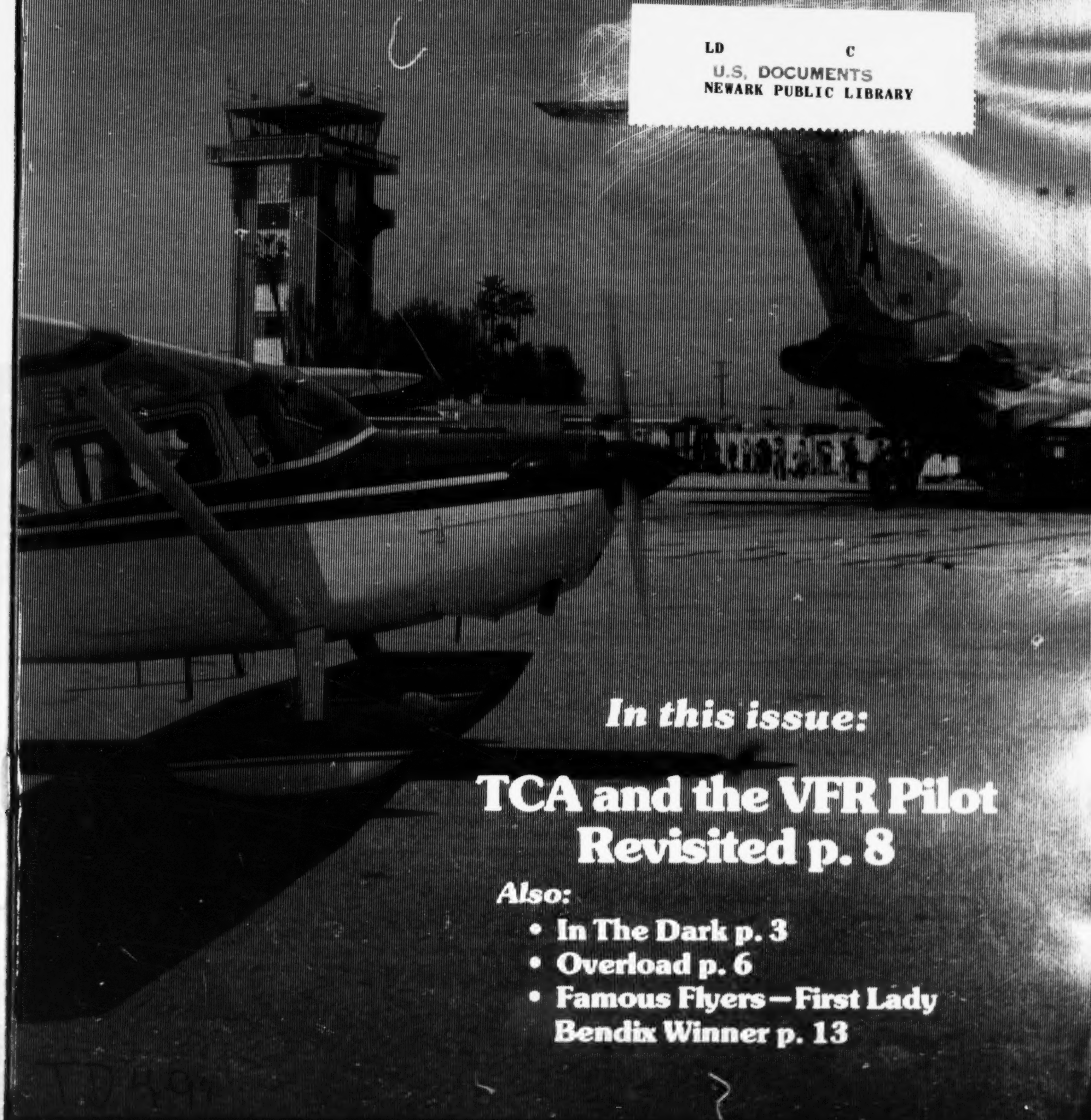

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- **In The Dark p. 3**
- **Overload p. 6**
- **Famous Flyers—First Lady Bendix Winner p. 13**

TD 4.9:

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/ FEDERAL AVIATION ADMINISTRATION

MAY-JUNE 1980
Volume 19, Number 3

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BRIEFS

JUMP FROM SEA LEVEL. Aviation Safety Reports show that some pilots of parachute-jump aircraft, when reporting "Jumpers Away" to air traffic control, are giving their altitude in terms of above ground level. Although FAR 105.25 does require the intended AGL altitude for advance notification of a jump, controllers need to know the mean sea level altitude of the aircraft when the jump is taking place, in order to assure accurate traffic advisories and separation service. A rule change to clear up possible confusion is being considered. See Advisory Circular 105.2A, "Sport Parachute Jumping."

REACTION TO DISTRACTION. Pilots undergoing certification flight tests should be able to maintain continuous control of the aircraft when confronted with distractions of various kinds. Failure to do so was cited in an FAA study on stall/spin accidents as being the leading cause of such accidents. FAA inspectors and pilot examiners are now authorized to simulate or provide common distractions while conducting check rides and to rate the pilot applicants on their response. Advisory Circular 61–92, issued January 25, 1980, provides information on the use of distractions during pilot certification flight tests.

RETURN OF THE ELT POSTPONED. The deadline for reinstalling ELT's on some 52,000 private aircraft has been extended from March 28 to October 15, 1980 because of a shortage of newly designed batteries to power the units. Only ELT's manufactured by Communications Components Corp., Garrett Manufacturing, and Leigh Systems are affected by the extension. All others must comply with the March 28 deadline.

Some 75,000 aircraft had their ELT's removed in 1979 following incidents resulting from crew incapacitation from noxious fumes or aircraft corrosion damage from leaking lithium sulfur dioxide ($LiSO_2$) batteries specified by several ELT manufacturers. Although new technical standards for ELT batteries were released in August of 1979, overall compliance with the March 28 reinstallation deadline for ELT's became impossible when many manufacturers switched to a different type of battery. Under the new standards not enough $LiSO_2$ batteries were on hand for the thousands of ELT's involved.

Pilots are reminded not to try to reinstall their ELT's. To assure proper installation and function, a qualified mechanic must do the work.

AIRSHOW CAUTION. Flight operations over open-air assemblies of people and below the minimum safe altitude (1,000 ft.) must be approved in advance by the nearest FAA District Office. Last Labor Day in Dillon, MT., two National Guard F–106 aircraft participating in a holiday parade flew over the crowd at an altitude of 100 ft.; one struck the top of a 109-ft. grain elevator, exploded, and crashed, killing the pilot and injuring 16 people on the ground. Unless the minimum safe altitude rules are waived by FAA, such operations are not authorized for any aircraft, military or civilian. No request for waiver was submitted to FAA in this instance.

IN THE DARK

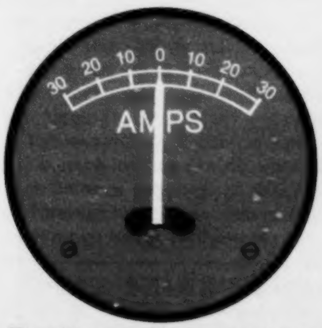
Lives have been lost for lack of an ammeter scan

How would you feel if you suddenly lost all electrical power just as you were preparing to land at a small airport in the pitch darkness of midnight? You can't see the panel instruments, you can't communicate, and you can't lower the gear manually because you can't find the gear crank in the dark because you have no source of illumination whatever—no flashlight, not even a bent match stick. What *will* you do?

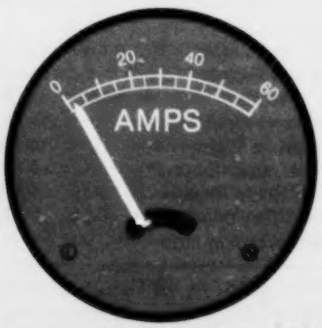
A situation of this kind was experienced by the pilot/owner of a Twin *Commanche* recently in central Missouri. Accompanied by one passenger, the 500 hour pilot, a local physician, had taken off from Poplar Bluff at 10:10 p.m. on a short flight to Rolla, Mo. The March night was very dark, with ceiling 4,000′ scattered, 12,000′ broken. The flight was conducted VFR, apparently routine, except that as he settled into his cruise altitude the pilot noticed that his wingtip lights and his panel lights seemed to be "less bright than usual." Everything else seemed in order, and he made no further investigation.

Descending toward Rolla, the pilot reduced speed and flipped the switch to lower his landing gear. He was greeted by a sudden and complete blackout of the entire lighting system and radio failure. Holding his course visually toward the lighted airport, the pilot groped frantically for a flashlight but found none, nor any matches. He suspected that the landing gear was not fully down or locked, but he had no way of confirming his suspicions. (He was not aware of the veteran pilot's technique for locking the gear by means of a sharp pull-up—which occasionally works.) In the darkness of the cockpit he could not find the wobble pump handle for lowering the gear by hand. He established what appeared to be a normal glide angle for the landing approach, reduced speed as much as he dared, and hoped for the best. On touchdown the gear collapsed and the airplane skidded to a stop at the edge of the runway, with only moderate damage and no injuries to the pilot or his passenger.

Investigators who inspected the cockpit immediately after the accident found the master switch on but the generator switch in the "Off" position. The pilot recalled that after noticing the dimness of his lights he had checked the master switch and the magnetos, but not the generator switch. He was in the habit of leaving the generator switch on at all times, and therefore had no reason to think it might be otherwise. However, he also recalled that some hours before departing Poplar Bluff he had instructed a mechanic to replace the rotating beacon light on his airplane, and it was possible the mechanic had noticed that the generator switch was on and had turned it off.



Battery Ammeter



Loadmeter

The pilot said he was aware of the ammeter instrument in the panel, but he was not sure about its significance and assumed it was unimportant. He has "learned his lesson," and now reads the ammeter every 15 minutes as part of his instrument scan; and double checks the position of both switches.

This pilot and his passenger were lucky. Electrical failures, especially at night, often have serious or tragic consequences. In a recent accident involving a twin *Aztec* near Seattle, all eight persons on board died when the pilot attempted to land in IFR conditions without electrical power. Over a two-year period, 1977–78, there were 47 accidents in which electrical failure was a principal factor, according to the National Transportation Safety Board. Five of the accidents were fatal, with 15 fatalities. There were three inflight fires, and two cases of fire erupting on the ground.

Most of these accidents could have been prevented if the pilots had a better understanding of aviation electrical systems or had used better scanning practices to monitor these systems.

Modern flying has become very dependent upon the so-called auxiliary electrical system (which includes all electrically powered components except the ignition). An in-flight failure often precipitates an emergency situation, especially at night, in IFR conditions, or VFR over unfamiliar ground. The components which commonly are electrically activated include all or some of the following:

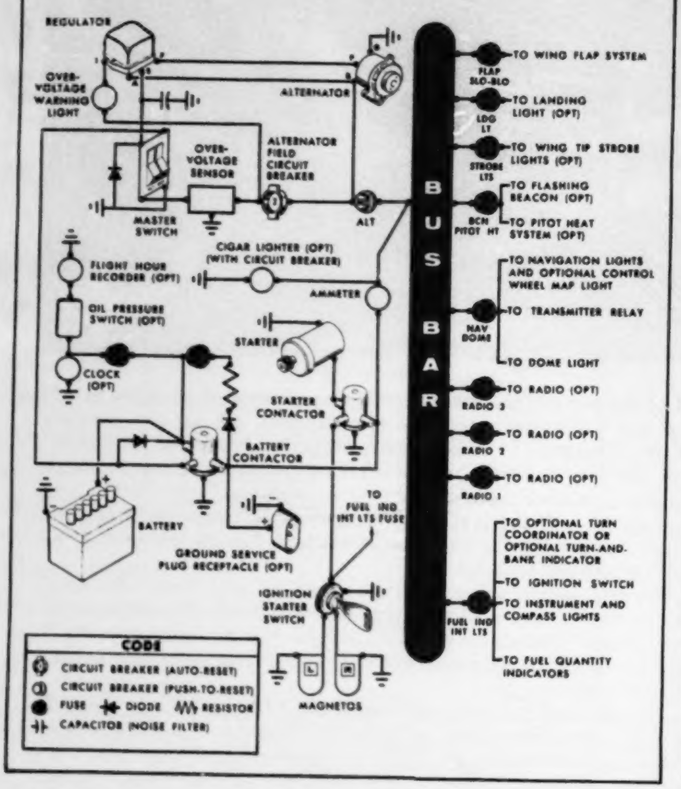
a) aux-fuel pump
b) avionics (all radio equipment except ELT)
c) defroster
d) de-icers
e) engine instruments
f) flaps
g) fuel gauges
h) landing gear
i) landing gear position indicator
j) lights—including panel instrument lights, warning lights, and cockpit illumination
k) pitot tube heater
l) stall-warning horn

NOTE: Some gyro-driven flight instruments, such as the turn coordinator or artificial horizon, may also be electrically driven in certain aircraft.

Inflight electrical power is provided by a generator or alternator, most of them belt-driven by the engine and basically similar to those used in automobiles. A battery, either 12 or 24 volts, is used to start the engines and power lights or radios when the engine is off. It also serves as a backup for electrical power aloft in the event of a generator/alternator

Cessna-150 Electrical System

SCHEMATIC


REGULATOR
OVER-VOLTAGE WARNING LIGHT
ALTERNATOR
OVER-VOLTAGE SENSOR
ALTERNATOR FIELD CIRCUIT BREAKER
MASTER SWITCH
ALT
FLIGHT HOUR RECORDER (OPT)
CIGAR LIGHTER (OPT) (WITH CIRCUIT BREAKER)
AMMETER
OIL PRESSURE SWITCH (OPT)
STARTER
CLOCK (OPT)
STARTER CONTACTOR
BATTERY CONTACTOR
BATTERY
GROUND SERVICE PLUG RECEPTACLE (OPT)
TO FUEL IND INT LTS FUSE
IGNITION STARTER SWITCH
MAGNETOS
B U S B A R
FLAP SLO-BLO
TO WING FLAP SYSTEM
LDG LT
TO LANDING LIGHT (OPT)
STROBE LTS
TO WING TIP STROBE LIGHTS (OPT)
BCN PITOT HT
TO FLASHING BEACON (OPT)
TO PITOT HEAT SYSTEM (OPT)
NAV DOME
TO NAVIGATION LIGHTS AND OPTIONAL CONTROL WHEEL MAP LIGHT
TO TRANSMITTER RELAY
TO DOME LIGHT
RADIO 3
TO RADIO (OPT)
RADIO 2
TO RADIO (OPT)
RADIO 1
TO RADIO (OPT)
FUEL IND INT LTS
TO OPTIONAL TURN COORDINATOR OR OPTIONAL TURN-AND-BANK INDICATOR
TO IGNITION SWITCH
TO INSTRUMENT AND COMPASS LIGHTS
TO FUEL QUANTITY INDICATORS
CODE
CIRCUIT BREAKER (AUTO-RESET)
CIRCUIT BREAKER (PUSH-TO-RESET)
FUSE
DIODE
RESISTOR
CAPACITOR (NOISE FILTER)

failure. The third component of this system is the voltage regulator, which directs current from the charging source into the battery when it is low-normally only after starting an engine.

This point is important for a correct reading of the two types of ammeters. One type, usually called a "loadmeter," measures the amperage being drawn from the charging system, on a scale from zero to maximum output. This ammeter refers only to the *generator/alternator output*, not to battery function. In flight, the loadmeter needle should move progressively up the scale as you turn on more electrical components, and descend as you turn them off. If the needle does not move, or descends without your shutting off electrical equipment, you have a failure in the charging system (or in the ammeter itself) and the battery may be supplying all electrical power.

Note that the loadmeter will not tell you directly that the battery is being discharged; you infer this from that lack of load indication on the generator/alternator. Some aircraft, usually older models, use the type of ammeter which is wired directly to the battery and shows the battery's approximate rate of charge or discharge. This type of meter should show a strong charge rate immediately after starting and a zero or very slight charge reading in cruise flight. *Any significant charge or discharge reading of the battery ammeter in flight will indicate a malfunction of the charging system and a depletion of the backup power.*

The difference between the two types of ammeters is important, because if a pilot normally flies with a center-zero (battery) meter in his panel he is used to seeing the needle on zero in flight; with a loadmeter this could indicate trouble. Either instrument will do the job, when read correctly.

Most inflight failures of the electrical system are located in the generator or alternator—perhaps because these are the only parts that are subjected to mechanical wear. Alternators, which have supplanted generators in recent years, have the advantage of supplying power at a much lower rpm rate then generators. The alternator has one significant disadvantage which must be remembered: it will not supply current when connected to a fully discharged battery (as a generator will). If you have an alternator and your battery is low, you are advised to start your engine from a ground power source, rather than risk flying off with a nearly depleted battery and a non-charging alternator. Your battery could have just enough power charge left to power your radios temporarily during your departure, since they draw very little amperage, but not enough to "excite" the alternator to begin charging. The battery would soon be depleted if the flight were to continue.

Whenever a battery has trouble starting up the engine, it is easy to assume the voltage is down because someone had left a switch on overnight, or that cold weather has made the engine very difficult to turn over, and all will be well once the engine starts up. But a weak battery often points an accusing finger at the charging system, which should be checked out carefully by a mechanic, or by monitoring the ammeter. A simple test is to turn the landing lights on and off after start-up. If your charging system is working, the loadmeter needle should move up and down or the battery ammeter needle should hold steady. Failure to do so could lead to electrical failure in critical conditions of flight.

This is what happened recently to the pilot of a Cessna *Skylane* who took off from Sanford, ME with two passengers on an IFR flight to Portsmouth, NH. The battery of the rented aircraft was very weak, which the pilot attributed to the wintry temperature on this March day, as he had personally checked to make sure all switches were off the night before. He got a ground power start and was on his way.

An ex-Navy pilot and used to generators, he assumed everything electrical was in order and did not bother to look at the ammeter after takeoff.

Table 1.

Electrical Load Analysis Chart for a Light Twin (Beech Baron)

Item	Number of units	Total amperes 24-volt system
A. *Continuous Load*		
Pitot Heat (Operating)	1	3.30
Wing Tip Lights	4	3.00
Heater Ignitor	1	1.20
**Navigation Receivers	1–4	1–2 each
**Communications Receivers	1–2	1–2 each
Fuel Indicator	2	0.76
Instrument Lights (overhead)	2	0.60
Engine Indicator	2	0.60
Compass Light	1	0.20
Landing Gear Indicator	1	0.17
Flap Indicator	1	0.17
B. *Intermittent Load*		
Starter	2	200.00
Landing Lights	2	17.80
Heater Blower Motor	1	14.00
Flap Motor	1	13.00
Landing Gear Motor	1	10.00
Cigarette Lighter	1	7.50
Transceiver (keyed)	1	5–7
Fuel Boost Pump	2	4.20
Cowl Flap Motor	2	2.00
Stall Warning Horn	1	1.50

**Amperage for radios varies with equipment. In general, the more recent the model, the less amperage required.
NOTE: Panel and indicator lights usually draw less than one amp.

Pilot Preventive Maintenance

Pilots are permitted to change fuses, light bulbs, reflectors, lenses, and broken wiring on landing lights. They may also check the battery charge (specific gravity) and fluid level and inspect the terminals for signs of corrosion (white powder) or leaks from cracks in the casing. The battery should be firmly attached to the frame and the environment free of loose metal objects which might fall across the terminals and cause a short or fire. Summon a mechanic if the generator/alternator seems loosely attached; or there is evidence of burning or arcing; or the belts are loose or cracked. The pilot may replace a dead battery, but that will not solve his problem if it was caused by a fault in the charging system.

Radio communications appeared normal as he received his IFR clearance and ascended to his en route altitude. Then "off" flags appeared on his OMNI instruments, and his communications radios faded out before he could notify air traffic control of his problem. He switched his transponder to the emergency code (7700), but by this time that instrument too was dead. He had a complete electrical failure, and he was flying in between solid layers of clouds at 6,000 feet on a busy New England airway. The next few minutes were very tense.

Attempting to reach Pease-Portsmouth (NH) Airport by dead reckoning, he realized that he had overflown his destination when he saw a Boeing 747 break through the clouds in a climb configuration. By cautiously backtracking the 747's flight path the *Skylane* pilot was able to break out over Boston's Logan Airport. His problems were not over yet.

With heavy jet traffic on the three major runways and visibility down to half a mile, he had to attempt a landing in instrument conditions without radar or radio contact. He circled the control tower twice and rocked his wings to signal radio failure but did not perceive any response. (Tower records show that at 11:40 a.m. local time the *Skylane* was observed circling in and out of clouds, whereupon all traffic was stopped and the Cessna was cleared by radio on 121.5 to land any runway. The emergency squads were dispatched to the crash site at 11:53, following an ELT signal reception.)

The pilot had elected to land on the short (2,468') runway 33R, as it appeared not in use. However, he landed with a 15 mph tailwind, was unable to lower flaps without electrical power, experienced hydroplaning on the wet surface, and overran the runway. The aircraft flipped over after the nosewheel strut sheared. The pilot exited the plane by kicking out a window and assisted his passengers to safety. There was no fire and, fortunately, no injuries.

A subsequent investigation of this accident disclosed that one of the brushes on the alternator had burned out and was no longer making contact. Small wonder that the battery was low. The pilot is now an avid ammeter reader.

Just how useful is the battery as a backup power source, after failure of the charging system in flight? That depends on the state of the battery. A fully charged 30 amp battery, for example, will supply 30 amps for one hour, or 15 amps for two hours—adequate for any light aircraft during that time period. However, no ammeter can tell you how much voltage remains in the battery at a given point in the flight—only a voltmeter wired into the battery circuit could do that.

Since few light aircraft have such an instrument, it is good practice to assume you are low on electrical power whenever your ammeters show that the charging system is not working normally, and/or the battery is discharging in flight. Make a precautionary landing as soon as convenient. In the meantime you can conserve battery power by turning off all electrical equipment you can do without. You will have to use judgement for such items as pitot heaters and navigation lights. Modern radio receivers and transponders draw minimal current, usually in the neighborhood of one or two amps, so these are usually left on. (See Table 1 for amperage loads.)

Frequent keying of the microphone uses considerable electricity, so try to get a complete message through on your first transmission, after acknowledgement. At night, locate anything you will need in the cabin (flashlight, gear crank, checklist, etc.) while you still have illumination. If you are depending on the battery only, and the battery ammeter needle begins to center itself, you know that you are just about out of current. Recall which instruments and equipment are electrically driven while making your descent, and plan your landing accordingly.

MASTER
OFF
START
ALT
ALT FIELD
AUTO PILOT
RADIO
AUX AMP
LAND LT
NAV LT
BCN LT
INT LT
INST
FLAP
STROBE LT
PITOT HT
TURN COORD
PITOT HT
NAV LT
BCN LT
STROBE LT
PANEL LT
RADIO LT

Circuit breakers may be in plain view or enclosed in pull-out panels.

Electrical failures in aircraft sometimes occur as a result of a short in the wiring or a sudden surge of electricity, or overload, which results in a blown fuse or popped-out circuit breaker. If the problem is a temporary overload, you can simply replace the fuse or reset the circuit breaker. One common cause of overload is leaving radios on when starting the engine.

FAR 91.33 requires that a complete spare set of fuses, or three fuses for each type required, be carried on board for IFR flight or VFR night flight.

Bear in mind that the circuit breaker is heat-actuated, and should be allowed to cool momentarily before being replaced. If the breaker continues to pop out despite these precautions, leave it out, turn off the associated component, and land as soon as the situation dictates.

With a little foresight, electrical failures will not lead to accidents. Reading the meter on the panel is not that difficult.

Why risk being out in the dark? ■

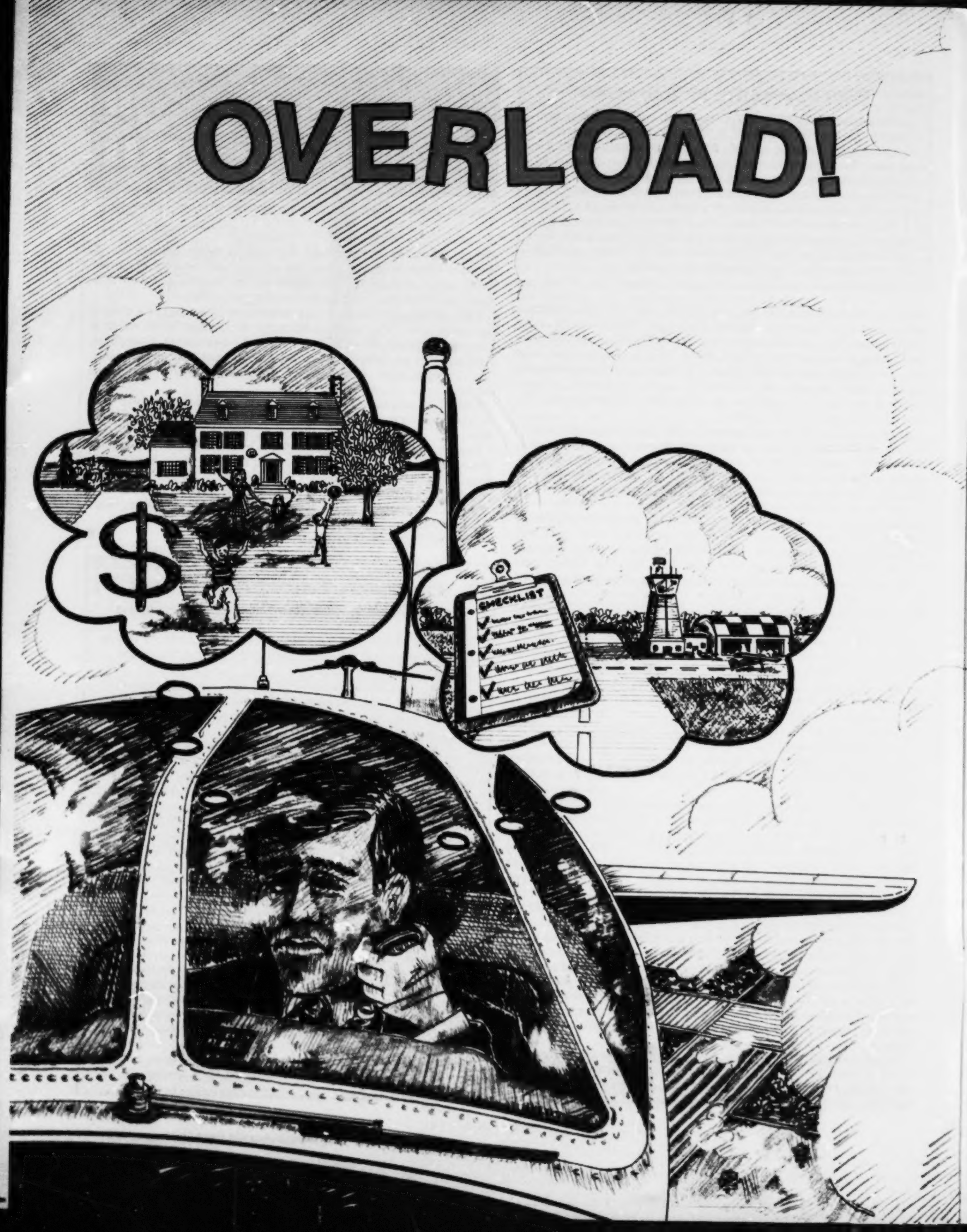
Emergency Procedures for Loss of Two-Way Radio Communication

- If failure occurs in IFR conditions or if VFR conditions cannot be maintained, the pilot shall continue the flight according to:

1. ROUTE
   a. By the route assigned in the last ATC clearance received;
   b. If being radar-vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;
   c. If there is no assigned route, by the route that ATC has advised may be expected in a further clearance;
   d. If there is no assigned route and no route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.
2. ALTITUDE—at the *highest* of the following altitudes or flight levels *for the route segment being flown*
   a. The altitude or flight level assigned, in the last ATC clearance received;
   b. The minimum altitude or flight level as prescribed in FAR 91.82(c);
   c. The altitude or flight level ATC has advised may be expected in a further clearance.

- If failure occurs under VFR conditions, *land as soon as practicable.*
- If minimal power remains, transmit a may-day over the radio, then turn off the radio and everything except the transponder. Tune the transponder to code 7700 for one minute to indicate emergency, then tune code 7600 for 15 minutes to indicate two-way communications failure. The transponder uses less power than the transceiver, and this procedure enables special attention to be given your problem by air traffic control, provided, of course, you are under radar coverage. If not, use your radio sparingly.

OVERLOAD!



All that hangs heavy in the airplane is not measurable weight

The accident at Lunken/Cincinnati appeared commonplace at first glance. The pilot failed to switch from tip tanks to mains before landing, lost his left engine on final due to fuel starvation, swerved off the runway, landed hard on wet grass and groundlooped before coming to a stop just short of a tractor mower. He was fortunate to escape with minor injuries; damage was substantial. Pilot error, again.

But there were several puzzling aspects. The pilot was ex-Air Force with over 6,000 hours of accident-free flight time. He was executive vice-president of a Virginia engineering firm with a reputation for perfectionism. He was flying his company's *Golden Eagle* (Cessna 421), a light twin whose purchase he had personally overseen, and in which he had logged over 500 hours. He held an ATR certificate with no restrictions. His medical and biennial flight review were up to date. He was the kind of pilot you "feel safer with than when driving your own car." Weather was VFR, and he was not under any particular time pressure. What went wrong?

A computer is sometimes said to be "overloaded" when it receives input at a faster rate than it can handle, and consequently it shuts down. The human mind, similarly, can become overloaded, or "task saturated," but instead of shutting down completely it may become prone to error, capable of simple, rudimentary mistakes.

"Task Saturation"

Certain conditions of flight, such as deteriorating weather, mechanical malfunction, single-pilot operation in complex aircraft, heavy traffic, etc. can build up a heavy pilot load; but normally the well-trained pilot is quite capable of handling the load with appropriate assignment of priorities. However, if his mind is simultaneously agonizing over insoluble personal problems, task saturation becomes a threat to his safety. A follow-up investigation of the 421 pilot indicated he was indeed a victim of overload.

The pilot acknowledged, during his interview after the accident, that his mind had been preoccupied recently with the emotionally painful proceedings of his divorce, involving custody of his three children, to whom he was closely attached, and the breaking up of a large country estate near Culpeper, Va., that had been in his family for five generations. Plagued with misgivings and guilt feelings, he had become "somewhat irascible" at the office of late and impatient with colleagues. In fact, his decision to fly to Cincinnati, on the day of the accident, had followed an unsatisfying telephone discussion with company representatives there who were having problems with a new water treatment project. He admitted that his decision was influenced by a desire to "get away from things for a while and think things out." For the same reason he did not invite anyone else from the office to fly with him.

No Problem En Route

On his way down to Culpeper/Martin Airport that morning he had obtained a weather briefing by car radiophone. With VFR weather forecast all along his route he did not bother to file a flight plan for the two-hour flight, but took off in the *Eagle* after a quick but thorough preflight check.

Airborne and cruising at 8,500 feet and his checklists completed, he set his OMNI on the 270° radial and turned on the autopilot. Time went by very quickly, and he found himself over the Ohio River near Portsmouth before he had been able to sort out any of the contradictions of his family situation. He began his letdown, contacted the FSS at Lunken for terminal weather, and called the tower for landing instructions.

The pilot's request for a straight-in approach to Runway 02R was accepted, but approximately one-quarter mile out just as he was going through his prelanding checklist, he received word that a commuter jet, cleared for takeoff, was having mechanical problems. The 421 was vectored around to the pattern for the shorter Runway 02L. Annoyed, he repeated his request for 02R, and was asked if he were low on fuel. Acknowledging that he was not, he reluctantly entered the pattern, where he was Number 4 to land behind a Mooney and two Cessna 150s.

He saw the second 150 make a tardy, clumsy, wide turn from base that required almost a 180° correction in order to line up with the runway. The *Golden Eagle* pilot was obliged to widen his own pattern and slow the twin down to minimum safe airspeed.

His annoyance was considerable. He watched the 150 weave its way down to the ground and finally bounce into a landing before he turned on final himself. He was about 100 feet from touchdown when the left engine sputtered, coughed and died. In that instant he remembered his interrupted checklist—he had been on the point of switching from tiptanks to mains—and he realized he must have run the left tip dry. He yanked the selector over, but the engine did not restart. He elected to continue the landing, added enough power to the right engine to avert the incipient stall, and did an admirable job of coping with the problems of assymetric thrust as he brought the crippled *Eagle* to a stop, only a few yards from disaster.

Functional Disruption

"Boring holes in the sky" for relaxation or for mulling over personal problems might have been a good idea 40 or 50 years ago, when airplanes were simpler and air traffic sparse. But the contemporary flight environment calls for constant alertness to the situation at hand; and the cockpit of a sophisticated airplane is no place to bring a worried mind. As the physical demand of the airplane on the pilot has lessened, the number of sequential functions has increased; and worrying can interfere with ordinary functioning.

It is not simply a problem of mental fatigue. Mental overload can lock the brain into a logical thinking mode, and result in overriding or ignoring habitual, functional responses to flight situations.

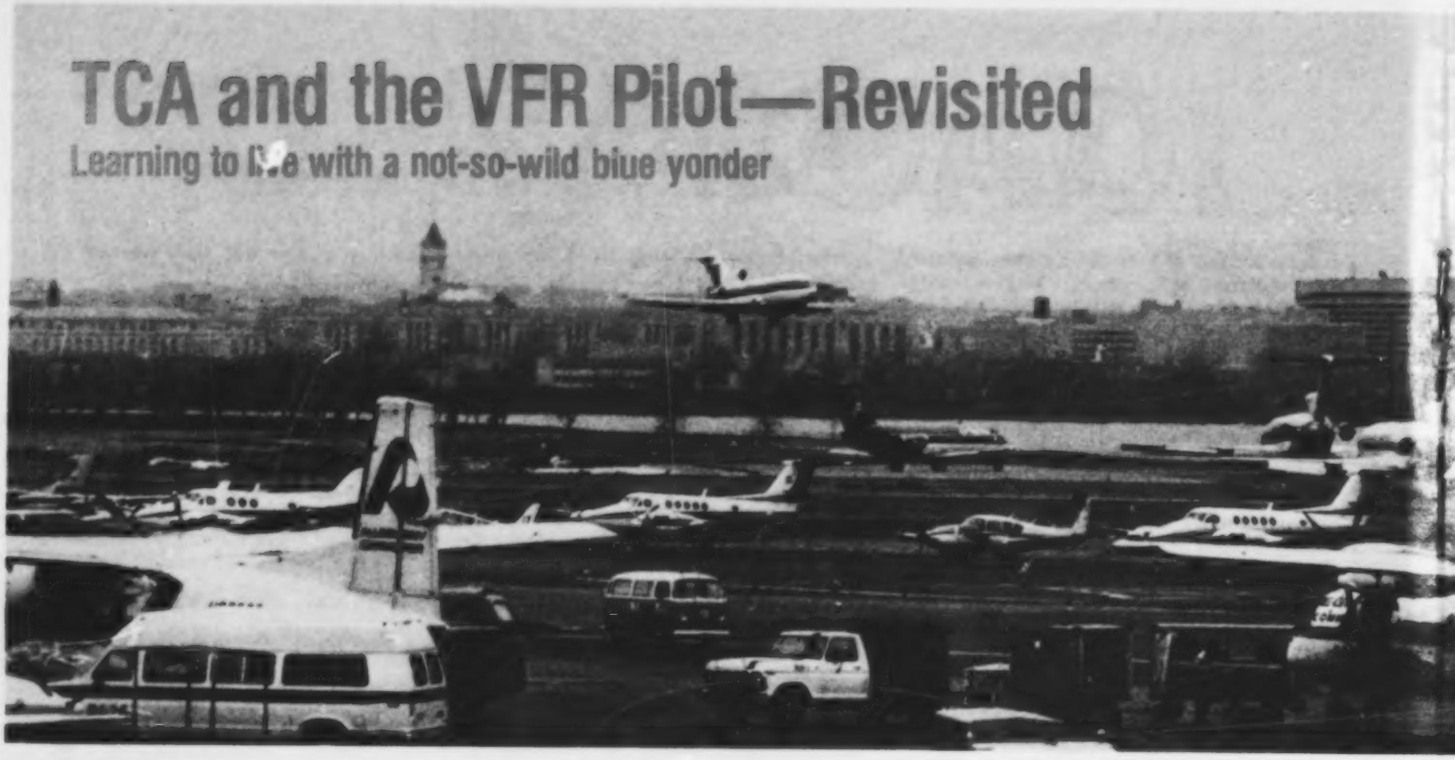
A pilot is more likely to become locked into this kind of thinking when he flies alone than if he shares cockpit duties with another pilot, or has the companionship of a passenger. Privacy may be essential for introspective thought, but an aircraft is not.

Carrying burdensome thoughts aloft can put you well beyond the gross weight limit. ■

(Certain details of the accident described in this article have been altered to preserve anonymity.)

TCA and the VFR Pilot—Revisited

Learning to live with a not-so-wild blue yonder



TCA (for Terminal Control Area) is an idea FAA has been using for the past ten years in the airspace surrounding the nation's busiest and largest airports, in order to handle the varied mixture of IFR and VFR traffic with a smooth traffic flow and maximum safety. Between 1969 and 1975 21 Terminal Control Areas were installed, to service airports which were handling at least one percent of all nationally enplaning passengers.

After a decade of experience and evaluation, the agency is convinced that TCAs are the most effective and economical means of preventing midair collisions in complex terminal areas. The number of fatal midair collisions involving air carriers dropped to zero in the TCAs, and the number of near-midair collisions also was reduced significantly. Within the next five years TCA coverage could be extended to an additional 30 or more major airports, where annual passenger enplanements total 650,000 or more per year.

For general aviation pilots who prefer to fly VFR this means two things: One, assurance of continued access to all civilian airports, air carrier-oriented or otherwise, on a first come, first serve basis. Two, a need to understand the TCA concept and the manner in which it can be used correctly and safely. An inadvertent penetration of a TCA can be very dangerous, as well as illegal.

What exactly is a TCA? A Terminal Control Area is an inverted "wedding-cake" of airspace around a major airport, usually extending up to 7,000′ MSL, 8,000′ MSL or even 12,500′ MSL, roughly 40 nautical miles in diameter at the top layer, in which *all aviation traffic is under positive control.*

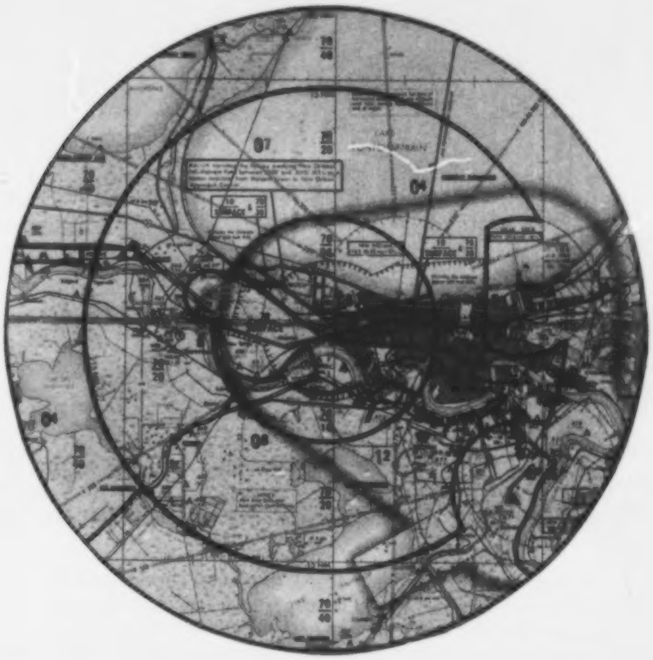
Positive control means that the aircraft's position and altitude and the pilot's intentions are known to an air traffic controller in the tower at all times. Group I TCAs, which currently are made up of the nine busiest air carrier airports in the United States, require participants to have a two-way radio, VOR or TACAN, altitude encoding transponder, and a private pilot certificate or better. Group II TCAs, 12 in all, which comprise the remainder of the busiest air carrier airports, have the same basic requirements except that they may be used by student pilots, and without the altitude-encoding feature of the transponder.

The typical TCA has a central column of airspace directly over the primary airport. This column is approximately 10–16 nautical miles in diameter at ground level, with several lateral extensions encircling the core at higher elevations called "floors." The design is broad enough at the upper levels to protect the runway approach and departure paths; and narrow enough or suitably indented near the ground to allow access to general aviation airports near the main facility.

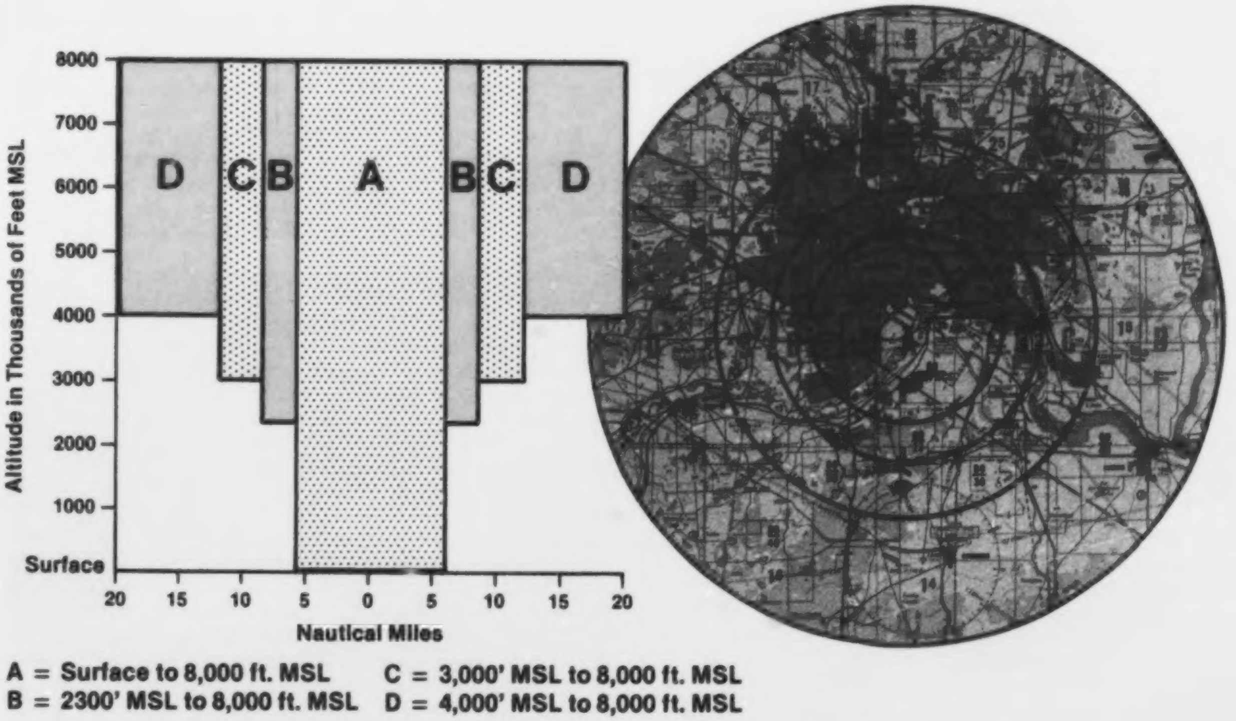
At Minneapolis-St. Paul, for example, the inner "cylinder" of the TCA has a diameter of 12 nautical miles from the surface to 2,300′ MSL. At this level the TCA is extended laterally to enclose a circular block of airspace 17 miles in diameter. At 3,000′ MSL the diameter of the protected area is extended to 24 miles. At 4,000′ the TCA is extended laterally to its maximum diameter, 40 miles, and includes the airspace between 4,000′ and 8,000′. At Minneapolis all the concentric "rings" of airspace are perfectly circular.

The New Orleans TCA, on the other hand, has only two outer rings surrounding the central core, or cylinder of airspace, with several inden-

Accommodating scheduled air traffic and random operations in a TCA.



Overhead View of New Orleans Terminal Control Area



Overhead and Side Views of Minn./St. Paul Terminal Control Area

Approaches in Washington National's TCA are complicated by the several Prohibited Areas around national monuments and traffic from eight general aviation airports and three military fields.

tations or "scallops" to accommodate access to nearby airports and to protect departure and approaches at the longest runway. New Orleans also has a feature which has been incorporated at some Terminal Control Areas to accommodate transitting VFR traffic: a flyway, or corridor, which allows VFR traffic to transit the area in an east-west movement without contacting the tower, and without having to fly out over Lake Pontchartrain. This corridor is one mile wide, with a floor of 1,000′ MSL and a ceiling of 2,000′.

Pilots intending to penetrate or fly near a major airport should first ascertain whether a TCA exists there (it will be indicated on the sectional chart). For safe penetration of the area, however, the pilot should not rely solely on the sectional chart, but should also obtain a current VFR Terminal Area chart.

These large-scale maps show clearly the detail of landscape which the pilot will need to identify in order to orient himself accurately to the TCA boundaries. TCA charts also show the appropriate frequencies for contacting air traffic control before penetrating the TCA. Frequencies differ according to altitude and aircraft bearing. The special TCA charts highlight geographical features and fix points likely to be used by controllers in vectoring VFR traffic. Note that the names shown and used by air traffic control to identify checkpoints may not always be the official names of the site.

Normally the pilot who calls in on the correct frequency will be radar-identified promptly, assigned a discrete frequency, vectored and sequenced for landing at his airport of destination—or given vectors for flying through the area. At times of heavy traffic flow the pilot may expect frequent course or altitude changes; and at peak hours at some of the busiest airports, delays may be experienced. Occasionally a terminal control area may become so heavily saturated with traffic that all departing or arriving aircraft, IFR as well as VFR, may be temporarily inconvenienced with delays. During peak hours at the busiest airports, operations may exceed 100 per hour. At any given moment of a peak hour an "Instantaneous Radar Scan" may show as many as 300 aircraft aloft in the largest Terminal Control Area.

Delays and detours can be minimized if the pilot contacts Approach Control well before reaching the outer ring of the TCA. This is especially true of the transiting pilot, who may be able to alter his course, underfly, or overfly the area with little actual loss of time or fuel.

Pilots who use the VFR corridors to pass through a TCA must be careful to remain within the boundaries of the unprotected airspace at all times, and to keep a sharp eye out for other traffic. Air traffic control does not monitor aircraft movements in VFR corridors, although the controllers will issue traffic advisories on request, workload permitting. Corridors are relatively narrow, and in some cases the flyways are near heavy flows of IFR traffic inside the TCA boundary; accurate navigating and continual vigilance are a must. Pilots not based near the TCA should study their terminal area chart beforehand, and be able to associate TCA boundaries with prominent landmarks.

Good scanning habits are important when flying *within* the TCA as well as outside. The degree of safety, as regards separation from other aircraft, when flying under positive control, is very great indeed; but the possibility of equipment or human error *can never be ruled out entirely*. The VFR pilot is advised to fly his airplane at all times with a sense of personal responsibility for his own safety. He is *not* expected to follow controller advisories blindly. If he becomes aware of what seems to him a potential conflict with another aircraft, he should not hesitate to report it. He should not change course without air traffic control approval, unless confronted with an immediate emergency.

Spotting potential collision threats is not simply a question of the time spent looking outside. Undisciplined eyes tend to wander ineffectively across space, or to focus on a fixed area of the sky; for effective scanning the pilot must deliberately shift his focus with short, regular movements which progressively cover the entire visible environment. Each movement should not exceed 10 degrees, and each area should be observed for at least one second.

Peripheral vision is very important for observing moving objects at considerable distance. Progressive refocusing of the eyes results in maximum effectiveness of your peripheral vision. This is especially important at night, when targets observable only as very dim lights can be picked up in this manner.

Not only the eyes, but the head and body should be moved as necessary to scan the area hidden by cockpit structures, such as door or window posts. A very large jet could be masked out by a very thin post.

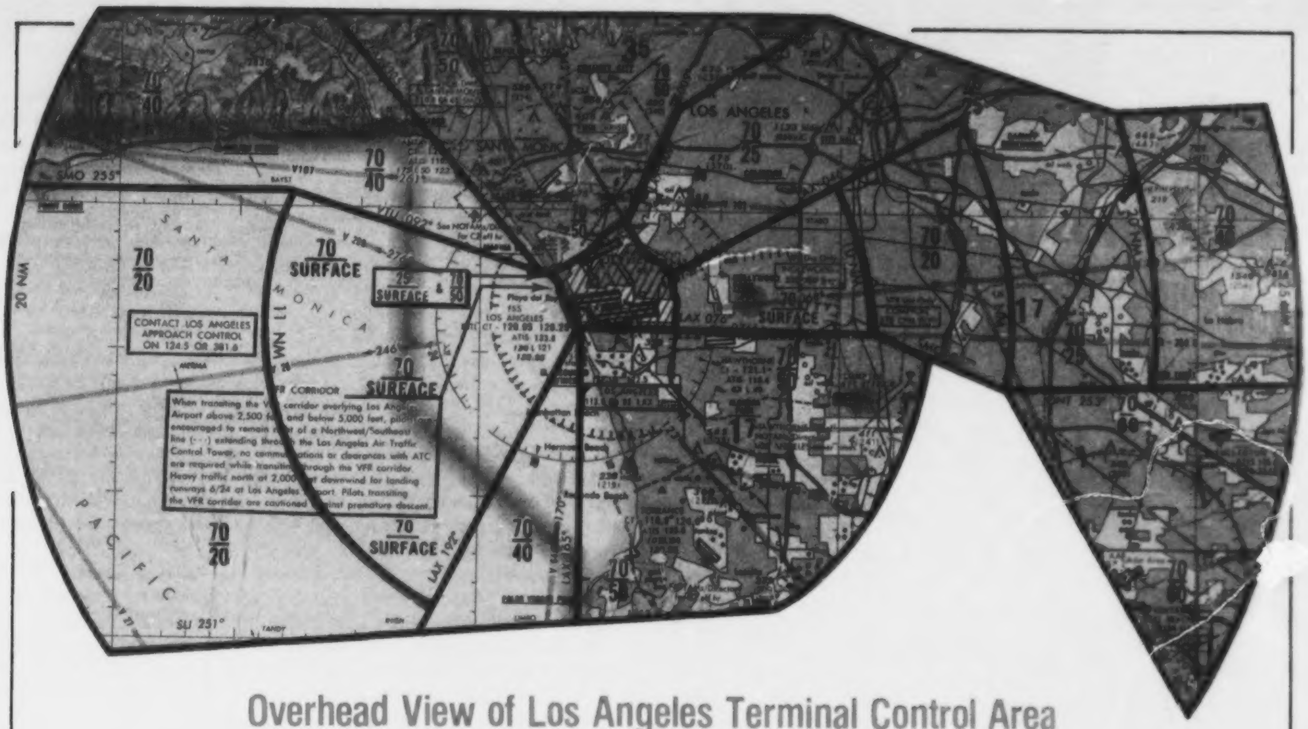
(Pilots interested in improving their scan ability should see the slide show program "Take Two and See," produced by the AOPA Air Safety Foundation and available on loan from their office at 7315 Wisconsin Ave., Washington, DC 20014, or from local FAA Flight Standards or General Aviation District Offices.)

Although some VFR pilots resent the Terminal Control Area as an "encroachment on free airspace," most general aviation pilots who have become familiar with flying in TCAs welcome the reassuring aspect of positive control, especially when they are flying light planes and sharing the airspace at busy terminals with huge transport aircraft and jets of all kinds.

In effect the TCA can be viewed as an extention of the airport traffic area at a major airport. The heavy flow and mix of traffic exists before the TCA is installed; by extending the jurisdiction of air traffic control a safer environment is created for all who participate.

Historically the great majority of midair accidents involving general aviation have taken place at the smaller, uncontrolled airports. However, the potential for disastrous collisions between air carriers and light aircraft, such as the San Diego accident in 1978 which claimed 146 lives, appears to be increasing at major airport hubs which do not have a Terminal Control Area. (A Group II TCA was installed in San Diego, effective May 15, 1980.)

A recent analysis of near-midair collision data recorded by FAA for a 33 month period (January 1976 through September 1978) disclosed some interesting facts. Of the 1,006 near-midairs reported overall, 129 involved an air carrier and a general aviation aircraft operating below 10,000 feet and within 30 miles of an airport of destination. Typically the air carrier was operating IFR, while the general aviation aircraft was flying VFR and not under air traffic control. Over the past 20 years the number of actual midair collisions between air carriers and general aviation has averaged slightly less than one per year, but one such accident is quite enough to blight an otherwise excellent aviation safety record, and to stir up public pressure to eliminate light aircraft from the airspace surrounding major air carrier airports.


LOS ANGELES
SANTA MONICA
PACIFIC
20 NM
11 NM
SMO 255°
V107
SU 251°
LAX 192°
LAX 076°
70/20
70/40
70/25
70/50
70 SURFACE
25 SURFACE & 70/50
17

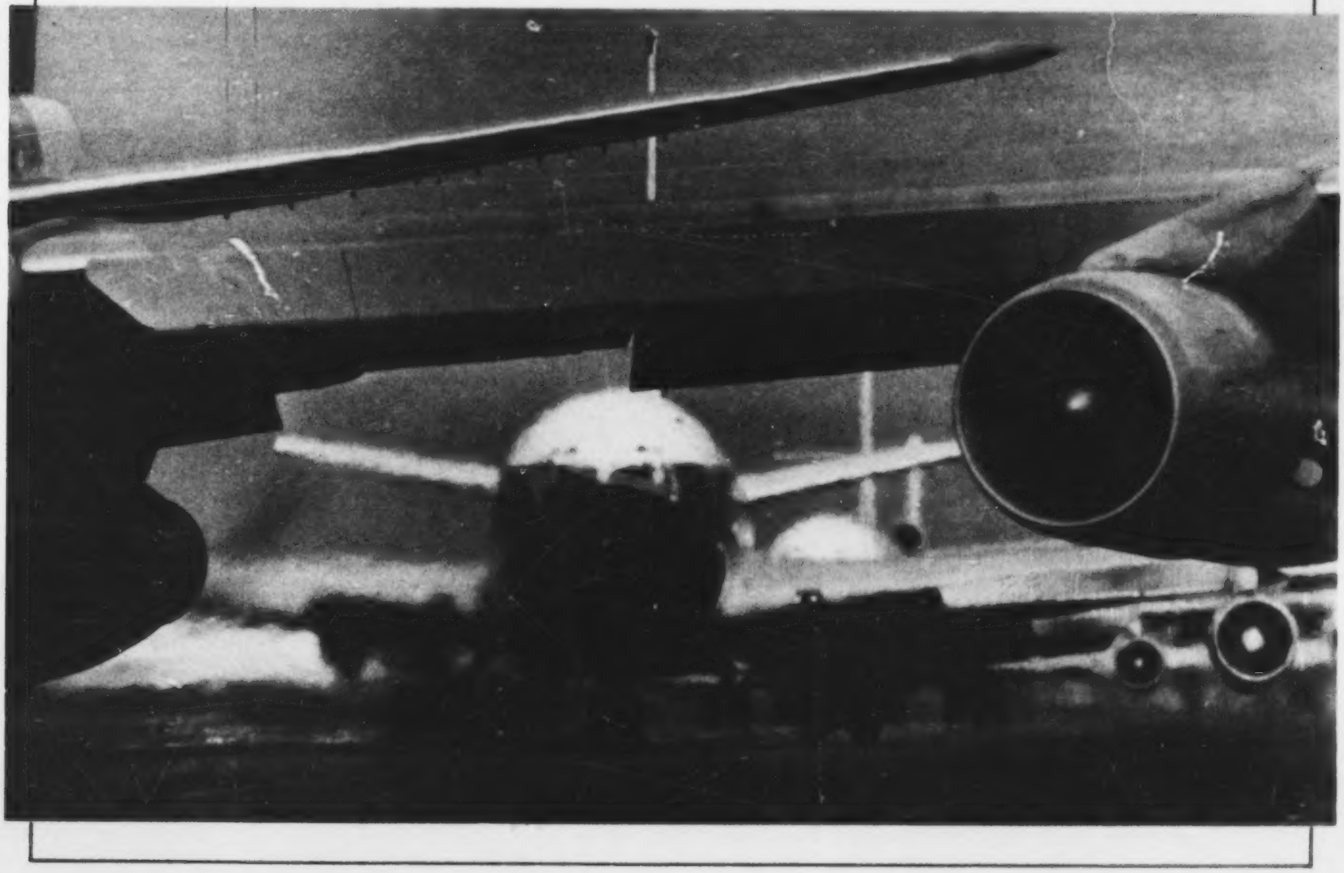
CONTACT LOS ANGELES APPROACH CONTROL ON 124.5 OR 381.6

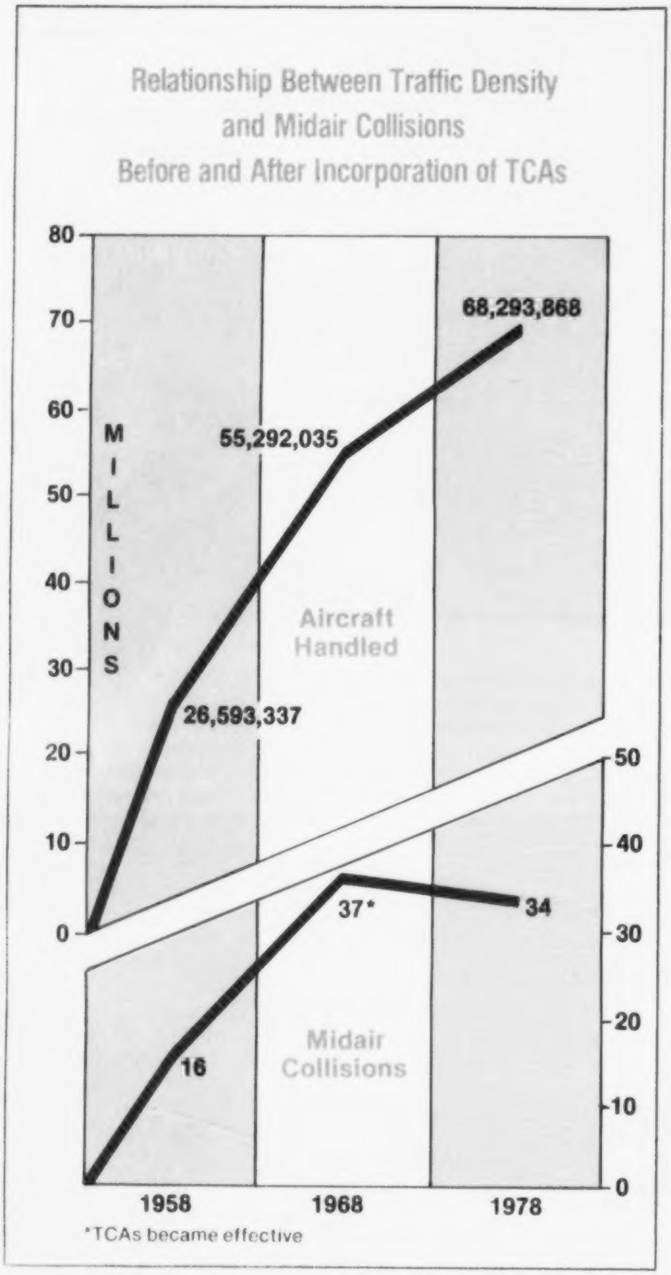
VFR CORRIDOR

When transiting the VFR corridor overlying Los Angeles Airport above 2,500 feet and below 5,000 feet, pilots are encouraged to remain north of a Northwest/Southeast line (- - -) extending through the Los Angeles Air Traffic Control Tower, no communications or clearances with ATC are required while transiting through the VFR corridor. Heavy traffic north at 2,000 feet downwind for landing runways 6/24 at Los Angeles Airport. Pilots transiting the VFR corridor are cautioned against premature descent.

Overhead View of Los Angeles Terminal Control Area

(VFR corridor above 2500' and below 5,000' MSL.)





Relationship Between Traffic Density and Midair Collisions Before and After Incorporation of TCAs

*TCAs became effective

There is no question that the decade ahead will see more aircraft competing for this airspace. Current projections show that the present civilian airfleet of approximately 200,000 aircraft will jump to 300,000 by 1990. The number of active pilots, now about 800,000, is expected to surpass one million within ten years. At the same time, new airport construction and expansion has slowed considerably, and is not expected to change its pace during a period of inflation and environmental concerns.

On the air carrier side, passenger enplanements are now in the area of 300 million per year. Before the decade is out this is expected to rise by 50% to 450 million. With greater air carrier dependence on wide-bodied jets carrying 300 or more persons, and the current shift to larger commuter and air taxi aircraft, the potential fatality total from any midair accident involving a commercial air carrier is very high.

The Terminal Control Area concept is only one of the measures FAA is taking to maintain air safety while accommodating more aircraft and more people within a given block of airspace. Both airborne and ground-based collision avoidance systems are being developed, based on an enhanced air traffic control radar system, and are expected to be in use by mid-decade.

Ground based collision avoidance will use specially programmed computers to monitor traffic flow and anticipate potential midair conflicts as long as four minutes in advance. The appropriate controller will be advised, and he will contact the pilots. No additional airborne avionics will be needed, although eventually air carriers will be required to have "Discrete Address" transponders.

Bear in mind that all ground-based collision avoidance systems being developed by FAA derive their conflict information ultimately from radar tracking of known aircraft. Their purpose will be to lessen the likelihood of a midair collision between "known" aircraft—i.e., aircraft being worked by traffic control. Essential information, such as altitude and pilot intentions, of aircraft not under air traffic control would not be known. The cost of any automated collision avoidance system that could deal successfully with "unknowns" would be prohibitive, and probably not feasible in a crowded airspace, where unforeseen mechanical errors could be calamitous.

Sophisticated airborne collision avoidance systems are being developed which will provide a cockpit warning display, with a resolution advisory. Suitable display equipment may be required for air carriers, approximately by 1985.

For general aviation pilots who wish to continue flying VFR with a minimum of required equipment and with a maximum degree of individual responsibility, the TCA concept appears the best solution. Like a one-way street system, it sometimes prevents you from going directly to your destination, but on the whole it gets you there faster. Furthermore, the pilot remains the captain of his ship. In a TCA the pilot reserves the right to decline any vector that, in his judgment, might jeopardize his safety or legality. He loses some freedom of maneuverability in the TCA airspace near large airports, but this is traded off against continued access to every airport in the country, with greater safety than ever.

Not a bad deal. No other country offers anything like this much freedom in the air. ■

Current TCA's
(excluding San Diego)

GROUP I

Atlanta, Georgia
Boston, Massachusetts
Chicago, Illinois
Dallas-Ft. Worth, Texas
Los Angeles, California
Miami, Florida
New York (Kennedy, LaGuardia, Newark)
San Francisco, California
Washington, D.C.

GROUP II

Cleveland, Ohio
Denver, Colorado
Detroit, Michigan
Houston, Texas
Kansas City, Missouri
Las Vegas, Nevada
Minneapolis, Minnesota
New Orleans, Louisiana
Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania
Seattle, Washington
St.Louis, Missouri

Projected Growth for Aircraft, Airmen and Traffic

	1978	*1988*
Aircraft	186,795	285,814
Airmen	796,833	1,951,000
Operations at Airports with ATC	68,293,868	97,100,000

Famous **FLYERS**

Louise Thaden

The Lady Tortoise who Outraced Jack Rabbit

"You know life stays a challenge as long as you look around and find the challenges. And that's what this life is about, I guess. It has to be about something, so it is about challenges. So long as you can find them you stay very much alive."

The given name of the lady who made that statement means "pugnacious," and she lived up to it. Who else would break every speed, endurance and altitude record for women she could find, and then go on to win the Bendix Transcontinental Race against the world's best pilots, male or female, in an odd-looking biplane never designed for speed?

Louise McPhetridge Thaden was born in Bentonville, a small town in northwest Arkansas, on November 12, 1905. At the early age of seven she showed an interest in aviation—jumping off the barn roof with an oversized umbrella, in the time-honored tradition.

Louise was not sure what she wanted to do with her life. In school she kept changing majors and never received a diploma. At age 15 she enrolled in college, then left after two years to go to work for the J. H. Turner Coal Company of Wichita, Kansas, selling coal, fuel oil and building materials. Her aviation dreams resurfaced when she found out that her boss, Turner, was a large stockholder in the Travel Air Aircraft Company, Louise soon wangled an introduction to Walter Beech, President of Travel Air, and began to haunt his plant on weekends, badgering the workmen with her insatiable curiosity about airplanes. She promised herself that she would learn to fly and that she was "going to get into aviation no matter how long or laborious the process."

Her employer, Turner, soon discovered Louise was spending more time at the Travel Air factory than she did in selling his products. Summoned to his office for what she was sure would be an angry dismissal, Louise was puzzled when he questioned her at length about her aviation interest. Puzzlement turned to delight several days later when Turner's friend Beech offered to train this slender, dark-haired, attractive and determined young women in aircraft sales promotion. He assigned her to his distributorship in San Francisco, where she learned to fly.

In 1928 Louise set out to boost *Travel Airs'* reputation with a spate of record breaking flights, beginning with the women's endurance mark, which she captured by circling Oakland Airport for 22 hours. The altitude record was next. In March of 1929 she shot her plane to over 20,000 feet—using makeshift oxygen equipment consisting of a small metal cylinder, an ether mask, a pair of pliers and a rubber hose. Crude, but it worked. In May of 1929, she went after the speed record. With the help of a special set of speed wings provided by Walter Beech, her *Travel Air* hit a speed of 156 mph. As the holder of the women's solo endurance, altitude and speed records, Louise became an overnight celebrity on the West Coast. She added to her fame that same year by winning the Women's Air Derby from Santa Monica, Cal., to Cleveland, Ohio.

The record setting and racing came to a stop in 1930, when she embarked on a new career: full time wife and mother. Her husband was a young engineer, Herb Von Thaden, who had started his own airplane factory to produce an all metal plane, the *Tin Goslin.*

By 1934 the Thadens with two children were feeling the pinch of depression and Herb was no longer with the aircraft company. So Louise followed Blanche Noyes' footsteps to Washington, D.C., and a job with the Bureau of Commerce's Air Marking Service. She embarked on endless junkets around the country to enlist local support in the Air Marking Program.

In August of 1936, Blanche Noyes and Louise were in San Antonio trying to talk the Texas state authorities into air-marking 600 towns. At the motel one night the phone rang and a voice said, "Hello, Louise? Say, would you like to fly in the Bendix Trophy Race this year?"

The call was from Ann Beech and straight out of the blue. The Bendix was the premier annual transcontinental race of the year, and traditionally all male. Furthermore, the airplane she was being offered hardly looked like a modern racer. Walter Beech had sold his *Travel Air* interests and was now concentrating on a new model, a closed cabin biplane with the upper wing resting on the cabin somewhat aft of the lower wing. This so-called "negative Staggerwing" Model 17 was designed for greater stability, visibility and lift efficiency, rather than for speed. The biplane era was almost over. How did Beech expect her to compete with the sleek new designs that would be battling for the Bendix money and international prestige?

The stubby biplane with the fabric-covered frame (and prominent ribs) she found waiting for her was powered by a Wright 420 hp engine that had already logged over 1,200 hours—hardly factory fresh. About the only concession to speed she could see was the streamlining of the wheel cover fairings. Cooperation from Beech's pilots—who resented seeing their entry in the Bendix offered to a woman—was minimal to zero. There was not only a dearth of spare parts, but also an absence of some essential instruments and equipment. Somehow Louise and Blanche, as her copilot, flew into New York in time for the great race on Sept. 7.

This race, Louise decided early on, was long enough to belong not necessarily to the swift, but perhaps to the patient. If there was one thing she had learned from her interminable travels as an air marker, it was to always know where you are, and never overheat the engine.

The Bendix rules were simple. Leave anytime you wished after the final briefing, but arrive in Los Angeles before 6:00 p.m. (same day) or you are disqualified. Land as often or where you like. The best overall time wins the $10,000 prize.

Louise and Blanche got an early pre-dawn start (4:30 a.m.), but found themselves surrounded by clouds before they had gone a hundred miles. Static obliterated reception on their low frequency radio, so Louise had to rely on dead reckoning until she flew out of clouds near Pittsburgh.

During a refueling stop at Wichita, Walter Beech learned that his pilot was using only 65% power. "What the hell do you think you're in, a potatoe race?" he roared. "Open this damn thing up!" Louise said meekly, "Yes sir," and continued on her way—at 65% power.

Late that afternoon the two women sighted Los Angeles Airport, so heavily shrouded in fog that they actually crossed the finish line in the wrong direction, taxiing sheepishly to the ramp. They were suddenly engulfed by a crowd of people. Louise had won the race.

Using only cruise power the *Staggerwing* crew had finished 45 minutes ahead of their nearest competitor, who, to rub salt in wounded vanities, was also a woman, Laura Ingalls. Louise was given an additional $2,500 prize for best woman pilot's time (14:55:01). Her average airspeed was 165.346 mph.

After the race Louise resumed her association with Beech as a demonstration flyer and sales promoter. She went on to win other races and other honors, but nothing she did ever matched the thrill of beating the best male pilots in the world at what used to be considered their own game. After Bendix 1936, it was anybody's game.

Louise Thaden died in Highpoint, N.C., on November 9, 1979, just three days short of her 74th birthday. ■

Flight Restrictions Around Volcanic Mt. St. Helens

Pilots are cautioned that flying sightseers in or around the restricted area of Mt. St. Helens, the currently active volcano in southeastern Washington State, can be hazardous. The airspace is experiencing unusual conditions of turbulence and visibility, which may have been responsible for several accidents to light aircraft. The eruptive force of the volcano is enough to toss 3-ton boulders 1,000′ into the air, and chunks of ice "the size of a helicopter" have reportedly been blasted from the cone of the 10,000′ mountain.

Temporary flight restrictions now affect the airspace surrounding the mountain near Portland, OR on a 10 statute mile radius to the west, and a 20 mile radius to the east, from the surface to 60,000′MSL. Pilots who receive permission to enter this area are reminded that radar separation by air traffic control may not be available. Check NOTAMs at your FSS.

¡Felices Desembarcos en Mejico!

The government of Mexico has recently issued new regulations affecting all flights of foreign-registered general aviation aircraft into its territory. Under existing rules, even if a flight has begun at a U.S. border airport, its first stop *has to be made* at one of 27 entry and departure airports for customs, immigration, and health handling before the plane can proceed to its intended destination. However, the new rules have added several different airports to the list of entry/departure points and several are no longer included.

Some of the regulations affect the cargo and baggage that may be carried in non-commercial operations. Insurance coverage for damages to third parties on the ground in the event of an accident has been increased.

For happy landings south of the border, and to avoid delays, consult a border flight service station well before your departure to see how these rules will affect your trip. The new regulations will be discussed in greater detail in an upcoming issue of *FAA General Aviation News*.

Visually Cleared for Takeoff

FAA is evaluating a six-month field test of VICON (Visual Confirmation of Takeoff Clearance), a system for providing pilots with visual confirmation of radioed takeoff clearances from control towers.

"VICON" confirms the clearance when the controller illuminates a light panel at the appropriate runway end. Visual confirmation could eliminate the possibility of incorrect clearance reception, believed responsible for the tragic ground collision at Tenerife with 581 fatalities in 1977. VICON was tested at Hartford, CT.

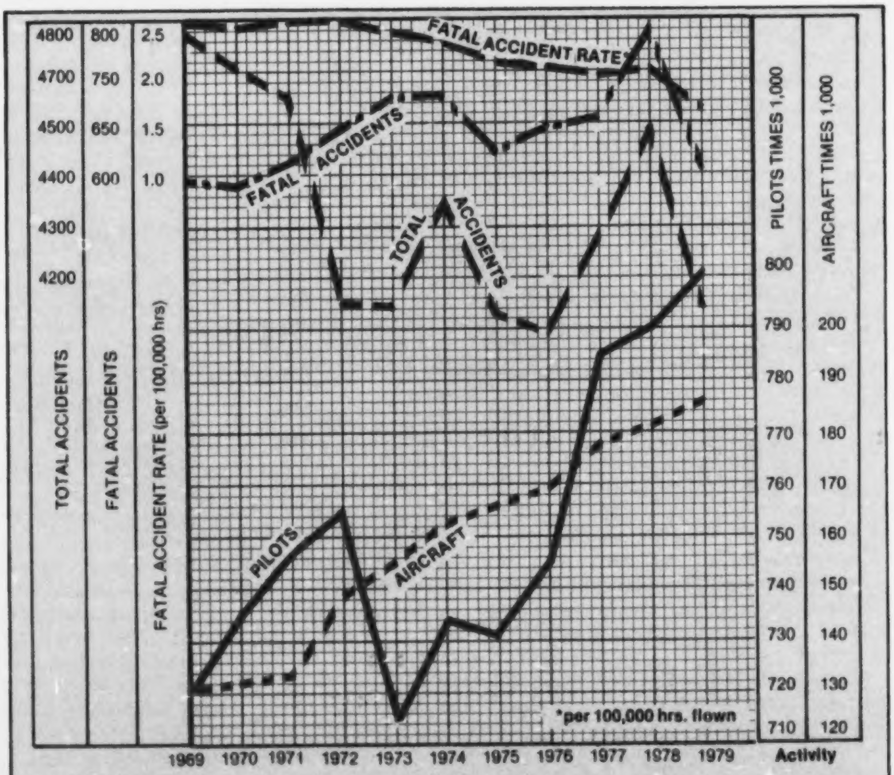
Clarifying Visibility Rules

Clarification of the visibility requirements for general aviation instrument landing procedures is under consideration as part of a proposed rule change to FARs 91.116 and 91.117.

Not everyone appears to understand that the responsibility given the pilot to determine prevailing visibility minimums from the cockpit means that he *must not* continue an approach below the minimum descent altitude (MDA) or decision height (DH) if the required visibility from his viewpoint is below minimums—even if the ground facility is reporting above-minimum conditions. Some pilots have not understood the rule to mean that if the slight visibility is reduced below published minimums at any time prior to touchdown, a missed approach must be executed.

Similarly, some pilots have evidently not known that the "markings identifiable with the runway," required by 91.117, are *in addition* to the weather minimums defined in the approach procedure.

The proposed changes would clarify the intent of these rules and incorporate them into a new Part 91.116. Additionally, the "identifiable markings" would be spelled out, to wit: either the runway, runway approach lights, threshold, threshold markings, threshold visual approach slope indicator (VASI), touchdown zone, or touchdown zone lights.



ACCIDENT STATISTICS IMPROVE. Increased participation by airmen and the aviation industry in accident prevention programs is credited by FAA for the reduction in general aviation accidents of all kinds in 1979. Total accidents decreased 6% over 1978, and fatal accidents 17%. The total accident rate per 100,000 hours flown dropped 7% and the fatal accident rate was 18%. The 1,311 fatality toll in general aviation was the lowest in nine years. Airman certification and aircraft showed a healthy increase.

Vikings Can Spin?

We enjoyed very much the article on "Spin Awareness" (November/December 1979). The commentary was accurate and informative. However, we question your use of a Bellanca *Super Viking* as an illustration. The *Super Viking* is rated in the "normal" category, no spins permitted. We'd love to spin our *Super Viking* a couple of times, just to find out how it handles in case we're ever faced with the real thing, but the rules say we can't. Hopefully, your next article on aerobatic maneuvers will be accompanied by a photograph of an aircraft capable of safely and legally demonstrating them.

Patricia and Christopher
Kilgour
Phoenix, AZ

The aircraft in the picture is a Viking rather than a Super Viking and was photographed at Transpo '72, for which appearance it had been modified by Bellanca for special maneuvers as an "experimental" aircraft. But you are correct: Do not spin a production model Viking. Not even on a bet.

"Invalid" Certificates?

In the letter "Change of Address" in the January/February 1980 "Forum," you reply that unless the Airman Certification Branch is notified of a change of address within 30 days of a move, the pilot certificate is "invalid." Is it truly invalid and thus illegal to fly until the notification is made?

J. Schwarz
Schenectady, NY

FAR 61.60 provides that the holder of a pilot or flight instructor certificate who has made a change in his permanent mailing address may not after 30 days from the date of the change, exercise the privileges of his certificate unless he has notified the Airman Certification Branch in Oklahoma City of the new address. The word "invalid" was technically incorrect, however, the phrase "may not exercise the privileges of his certificate" is quite clear. Note that a pilot may move to a different residence without affecting his permanent mailing address.

Ground Time?

Can a flight instructor log as pilot-in-command time or instruction time any time he is on the ground but has supervised the student's flight?

Name Withheld

Negative. The flight instructor logs as instructor or PIC time only that time he is physically in the airplane.

Anti-Collision Lights

I live near a large metropolitan airport, and recently I noted several air carrier aircraft taking off and landing without anti-collision lights on. Since I am the inventor of several of these devices, for which I gave the patents free to the government, I have been wondering if there is a change in the rule about the use of anti-collision lighting. What exactly is the rule?

Charles Adler, Jr.
Baltimore, MD

Transport category aircraft are required to have their anti-collision lights turned on during operating hours between sunset and sunrise. The FAR's also specify certain characteristics for the lighting systems such as field of coverage, flashing characteristics, light intentisy, and location on the airplane.

FAA also has a voluntary program, "Operation Lights On," which encourages pilots to turn on their anti-collision lights any time the engines are running—day or night, in the air or on the ground, in the vicinity of airports.

More on Numbering Fixes

Mr. Swinnie's letter in the November/December 1979 issue about numbering rather than naming VORs and intersections is right on target. This can be a problem for pilots in unfamiliar territory. I propose that all en route charts be divided into nine equal segments, numbered one through nine, and all intersections, VORs, etc., in each section be assigned a letter of the alphabet. Using Low Altitude En Route chart L23 as an example, if the controller wanted to clear an aircraft to an intersection in section 9, he would tell the pilot, "Cleared to L239A." This would tell the pilot on L23 in section 9, he has been cleared to intersection A. Each section could use the entire alphabet, and if there were more than 26 intersections in a section, further subdivisions could be worked out.

Ray Carlson
Long Beach, IN

The system you propose has considerable merit, but it would be difficult to implement for several reasons; (1) The current system is in use worldwide, and any changes we made may be confusing to foreign users of our airspace; (2) due to the overlap of charts, many fixes or navigation aids appear on more than one chart and under your system would have different designations, also adding to confusion; and (3) alphanumeric designations like L239A would require the use of the phonetic alphabet for identification, which would greatly lengthen the transmission time.

Safely Over-Gross?

If I fly my *Bonanza* five pounds over gross on a non-commercial flight and think I can do so safely, am I flying illegally? If so, would most insurance policies be void during that period?

Ted Farrell
Inglewood, CA

Any over gross flight operation, even one pound, would be illegal according to FAR 91.31 which provides in part that "no person may operate a civil aircraft without compliance with the operating limitations for that aircraft." Many insurance policies contain a waiver which disallows payment of a claim if noncompliance with the FAR's can be proved in connection with an accident.

Engine-Out Incidents

In the January/February 1980 article, "One Engine Out," you mention that 94 engines failed at altitude and 52 on takeoff/climbout. It has often been said that an engine failure is most likely to occur at the first power reduction. The twin engine failure statistics in the article do not seem all that indicative of failures at the first power reduction. Are there any statistics to back up when engines are most likely to fail?

John L. Martin
Piscataway, NJ

Unfortunately, negative. As stated in the article, many engine failures in flight go unreported when the pilot is able to land without damage or injury.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

Triumph by Association

The article in the January/February 1980 issue about Blanche Noyes was very fine. However, it was in error in stating that Mrs. Noyes was the winner of the 1936 Bendix Race. That honor went to Louise Thaden. Blanche Noyes served as her co-pilot in that race.

Joe Knox
Greensboro, NC

Right you are. Louise is given her due in this issue's Famous Flyers story (p. 13).

Accident Reports

Under "Briefs" in the January/February 1980 issue, I noted with interest the article "Chopped Baggage" because a friend of mine died in a similar accident. How could I get a copy of the accident report assuming it is public information?

Lee R. Hallerberg
Costa Mesa, CA

Once the accident investigation has been completed, pertinent factual information is kept in a file in the Public Inquiry section of the National Transportation Safety Board in Washington, DC. To request a copy of an accident report, send all identifying data you can (date, airplane, N-number, pilot's name, accident location) to Public Inquiry Section, National Transportation Safety Board, Washington, DC, 20594.

TCA Formula

Please advise how an IFR flight in a light plane can be completed through the New York TCA en route to New England on Victor Airway 3 without being routed to upstate Pennsylvania or out to sea. Both cost time and fuel. If you know a "formula" kindly advise, and many pilots will be grateful for hundreds of hours and volumes of fuel saved.

Robert Buher
Baltimore, MD

Because of the heavy arriving/departing traffic flow in the New York TCA (which overlies three major international airports as well as some 21 general aviation airports), direct routing of transiting IFR traffic through the TCA on V3 during busy daylight hours is unlikely. You may ask to overfly the TCA and indicate the highest altitude you can accept. If you do not want the over-water route, you may decline it and be reassigned a land route.

INSTRUMENT CORNER

Holding Pattern Approaches

If an approach depicts a holding pattern at the final approach fix with the inbound leg aligned with the intermediate segment of the approach, what is the proper procedure for a course reversal where the restriction against making the approach from the holding pattern applies? Is it acceptable to extend the outbound leg in the holding pattern for an additional minute, for instance, while staying within the 10-mile limit, then turn inbound, and, when established on the intermediate segment begin descent and complete the approach?

Thomas E. Miller
Ballston Spa, NY

Affirmative. The outbound leg may be extended as long as the aircraft stays within the 10-NM limit; however, unless otherwise restricted by an indication on the approach plate (see Airman's Information Manual paragraph 371 a and b), the type and rate of the procedure turn and where it is begun is left to the discretion of the pilot.

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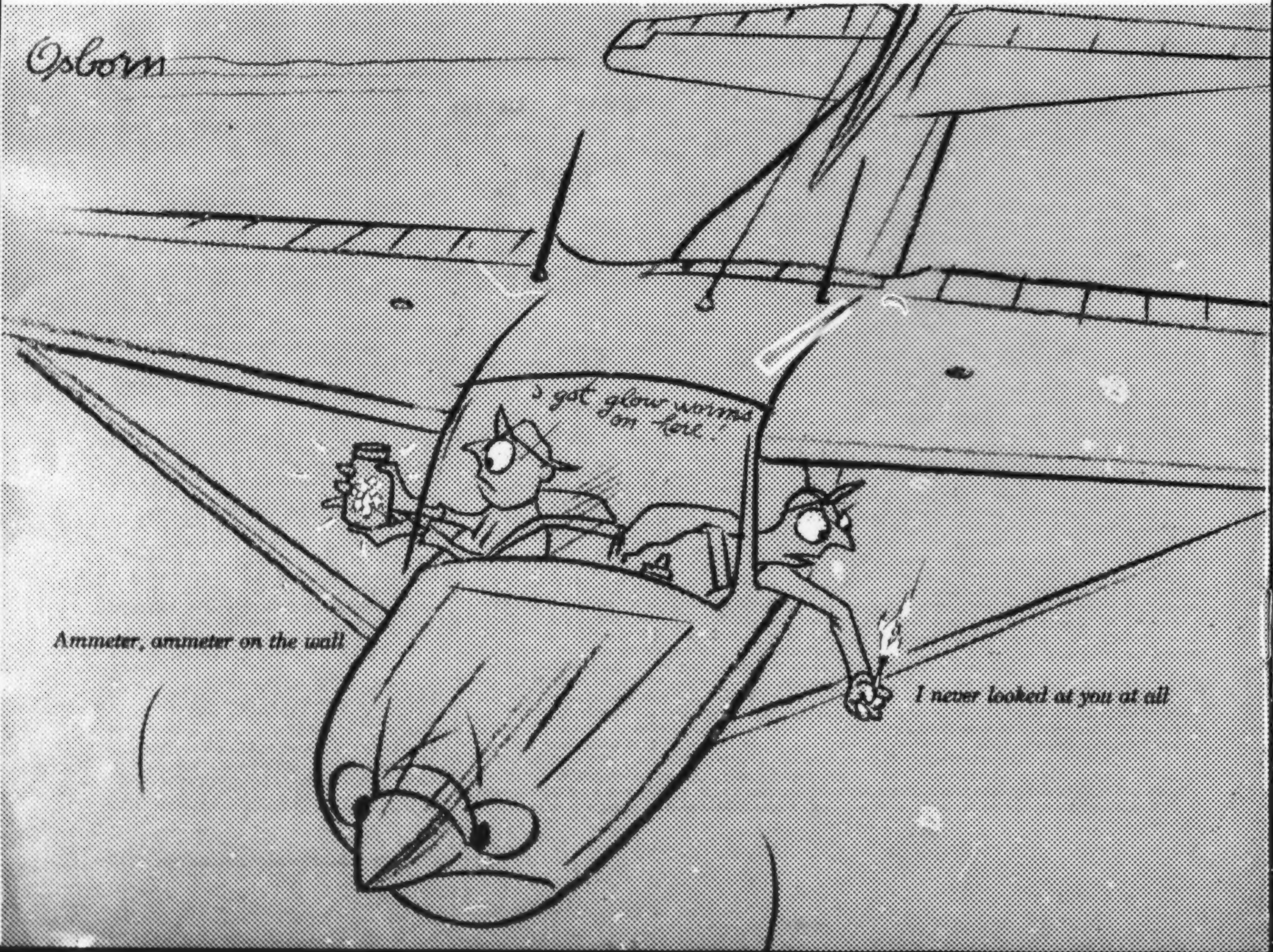
Osborn
I got glow worms on here!

Ammeter, ammeter on the wall

I never looked at you at all

FAA general aviation NEWS

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FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION

JULY-AUGUST 1980
Volume 19, Number 4

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BRIEFS

DEAD AIR. When you key your microphone you block off your receiver on that frequency—right? Partly right. You also block out every other receiver tuned to that frequency in the area. Inadvertent keying of the transmitter is a growing problem that can create danger for any pilot in the air traffic system.

This is a very good reason for 1) listening carefully before you key, so that you do not render incomplete a transmission from air traffic control to one of your fellow pilots, and 2) making certain that your microphone is not being keyed unintentionally by nervous hand pressure or improper stowage. Microphones rarely become jammed by mechanical failure; careless usage is more often the culprit. Allowing children to "touch" the instrument is asking for trouble. Except in an emergency it should never be handled by anyone other than the pilot.

Inspect microphone plugs and jacks for looseness or fraying and have necessary repairs performed by an FAA approved repair station. Incidentally, if you find yourself victimized by radio reception blockage at a time when you have urgent need of communication with air traffic control, remember that most FAA ground facilities have more than one frequency, and they always guard 121.5.

ALTIMETER AND AEROBATICS. Apparently some airshow performers are under the impression they must comply with the provisions of FAR 91.81 ("Altimeter Settings") during aerobatic flight. However, 91.81 applies to *maintaining* a flight level or cruising altitude, something not done in aerobatic flight.

HOT FLASHES. Electrostatic charges that build up on fueling equipment during fueling operations are an ever-present danger, especially so in hot weather when the air temperature is close that of some fuels' flash points—the temperature at which the fuel vapors can be ignited. Proper grounding of the airplane and fueling equipment, reducing the fuel flow to lessen the static build-up, and eliminating splashing of fuel which causes misting and stirs up vapors, all help to decrease the possibility of a static discharge that could make a hot day much hotter.

SWITCH HUNT. Unauthorized modification of required warning systems on business jets, to permit "hand-flying" the airplane in near-Mach I speed ranges without having to cope with aural signals and/or automated control responses, has become a potential hazard to flight safety. Illegal, unmarked cut-out switches were found recently in half a dozen *Learjets*.

Cut-out switches invalidate an aircraft's airworthiness status and jeopardize the pilot's ability to maintain control in certain phases of flight—especially if the switch is left open without his knowledge. Depending on how it is wired, a cut-off switch could deaden several warning systems. Operators of *Falcons, Sabreliners, DH–125s, BH–125,* and *Citations*, as well as *Learjets*, should have them undergo inspection for removal of unauthorized switches and checkout of all warning systems.

UFO VS VFR

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You may or may not believe in the reality of UFO's from outer space, but if you are a pilot you have probably had more than one occasion to become concerned about unidentified flying objects—namely airplanes—that materialize abruptly in the vicinity of your flight path.

Given the continuing increase in aircraft operations at large airports and the rising numbers of jets and other high performance aircraft, the responsibility of the VFR pilot for maintaining a safe separation from other traffic is greater than ever. The National Transportation Safety Board reported 36 midair collisions in 1978—a record high for the past decade—and most of these involved VFR aircraft.

What can the concerned VFR pilot do to maintain his safety? Two things:

1) Make certain his scanning technique is super sharp.

2) Utilize available radar to fit himself into the flow of traffic in and around major terminals.

About half of the midairs take place within range of an approach/departure control facility, where radar traffic advisories and vectoring are available on request to VFR traffic. Radar is not a substitute for your own eyes, but it can often help to sharpen your vigilance.

A case in point is a recent accident near Tucson, involving two single engine aircraft, a *Skyhawk* (Cessna 172), and a *Cardinal* (Cessna 177), on a clear bright wintry morning with 60 miles visibility and seemingly endless quantities of unoccupied airspace. The *Skyhawk*, a high-wing aircraft painted white top and bottom, had departed from Mesa, Ariz. (near Phoenix) shortly after dawn on a VFR flight to Tucson International. The pilot, ex-military, held a commercial certificate with instrument rating. On board with him were his wife and one other man, who was accompanying him to a business meeting in Tucson.

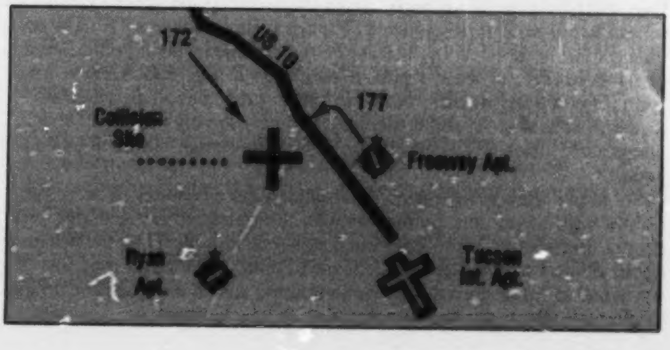
The airport is located in a desert basin surrounded by mountains that reach up to nearly 9,000 feet. The *Skyhawk* was approaching the city from the northwest, on a preferred route over a freeway (U.S. 10) that led through a broad valley between the mountains. At 8:00 a.m. the pilot contacted approach control and was radar-identified at 15 miles northwest of the airport. At this time he was flying at an altitude of 3,500 feet, over terrain that is approximately 2,400 feet MSL. The *Skyhawk* pilot was advised to "resume own navigation" for a straight-in approach to Runway 11L.

Meanwhile the *Cardinal*, also a white painted high-wing aircraft, had taken off from Freeway Airport, a small field adjacent to U.S. 10 and about 12 miles northwest of Tucson. The 28-year-old pilot, the only person on board, had accumulated 231 hours of flight time and held a private pilot's certificate. His ultimate destination was Yuma, about 200 miles west, but he planned to make an initial stop at Ryan Airport for fuel, which was not available at Freeway. Ryan is approximately 10 miles west of Tucson International.

The *Cardinal* pilot did not contact air traffic control, either before or after taking off. His aircraft did not show up as a target on the radar screen. Approach control was not aware of the operation. Witnesses on the ground at Freeway saw the airplane take off from Runway 30 and enter a left climbing turn, which would place it on the west side of U.S. 10.

Several other witnesses stated later, according to the National Transportation Safety Board report, that shortly after 8:00 a.m. they saw two small aircraft in close proximity in this area, one heading inbound toward Tucson, the other climbing out from Freeway. One witness was a fireman who had just reported to work at the North Tucson fire station. He said:

"I was looking toward the northeast. At this time they both appeared to be flying towards the southeast with one plane approximately 20 feet higher than the other. They both appeared to be flying rather low, about 1,000 feet (above the ground). The plane that was higher (Plane No. 1) was about 25 feet behind the second craft (Plane No. 2). Plane No. 2 was climbing at an angle of about 30 degrees and was turning to its left. Plane No. 1 appeared to be following a straight level path. They continued in this manner until impact. I saw nothing that would indicate to me that either pilot saw the other."



After the collision, the wing was sheared off the *Cardinal*—which fell toward the ground in a spinning dive. The 172 appeared to climb for about 30 feet, according to the fireman, and then entered a diving descent. The airplanes hit the ground about a quarter of a mile from each other, about 2½ miles northeast of Freeway Airport. Both airplanes were destroyed by fire, and all four persons on board died.

The Safety Board gave the probable cause of this accident as "failure to see and avoid other aircraft." Both pilots were engaged in a perfectly legal operation, and presumably both were scanning visually. The fact that they were flying more or less directly into the morning sun could have been one of several factors contributing to the collision. But air traffic control authorities believe that one unnecessary factor was that each aircraft *was unknown to the other*, and only one (the *Skyhawk*) was known to approach control. Possibly the *Cardinal* pilot was unaware of the traffic advisory service available to VFR aircraft in such circumstances. Had he notified approach control of his intentions with a radio call, the *Skyhawk* pilot might have been vectored safely away from his intended flight path. At the very least, the pilot would have been alerted to the presence of an aircraft climbing out from Freeway, which apparently he did not see on his own.

THE APPROACH CONTROL FACILITY

Most VFR pilots are familiar with *local* controllers whom they see in their glass-walled cab atop an FAA control tower, whose function they know is to exert advisory control over aircraft landing and taking off. Less familiar is the *approach/departure control facility* which is usually, although not always, located in the same tower in a windowless room underneath the cab. Most approach/departure control facilities are radar-equipped, and their primary function is to provide separation for IFR traffic for that segment of the airspace that lies between the airport traffic area and the en route sector. Surveillance up to 40 miles is maintained by means of radar and radio contact.

Over the past 20 years, as more and more terminals have been equipped with radar, FAA has been steadily expanding its radar advisory services for VFR traffic.

These services were introduced in the early 1960's, when VFR pilots flying near airports with radar-equipped approach control were able to ask for "radar advisories"—radar-derived location of other traffic being worked by the controllers, which could be of possible concern to them.

This early stage of the service was expanded in the late 1960's to "Stage II", which included sequencing VFR aircraft for the landing approach prior to reaching the airport traffic area.

In 1970 the Terminal Radar Service Area— or TRSA—was developed. The service provided in a TRSA (also known as Stage III) includes not only radar advisories and sequencing, but also continuous radar separation (1½ miles laterally and 500 feet vertically) between all participating VFR aircraft and all IFR aircraft within the airspace designated as a TRSA.

RADAR SERVICE AREAS CHARTERED

Beginning in April of this year, these 132 Terminal Radar Service Areas across the nation are being indicated on aeronautical charts. The TRSA looks very much like the mandatory TCA, or Terminal *Control* Area, on a sectional, but there are some important differences. One, Terminal Control Areas are colored blue, while the TRSA's are magenta (purple). Two, the utilization of air traffic control services by VFR pilots in a TCA is *mandatory* at all times, while VFR participation within a TRSA is *voluntary*. Furthermore, at the busiest TCA's landing or taking off is limited to pilots holding at least a private pilot's certificate, and flying a transponder-equipped aircraft, whereas TRSA participation is available to student pilots as well, and a two-way radio is the only required "special equipment." (See "TCA and the VFR Pilot-Revisited," in the May-June issue.)

Some pilots are uninterested in terminal radar advisories because they do not wish to burden themselves with the details of an air traffic procedure that sounds complicated and time-consuming. They have heard about Stage I and Stage II and Stage III and TRSA's and they just do not want to be bothered with remembering the differences and trying to discover which services are available at which airport.

In point of fact, using the service requires very little preparation or memorization. You simply contact the approach/departure control position of the air traffic facility maintaining radar surveillance over the area you are flying in, and tell them your location and intentions. They will establish radar contact and then provide you with traffic advisories as well as sequencing and separation, if the latter are appropriate. You can decline any or even all of these services and still receive added protection from the possibility of a midair collision. The fact that you are no longer an "unknown"—that air traffic control knows *who you are and where you are going*—means that they will be watching your progress for any conflict possibility, even though you may not hear from them again.

This does not mean that you can afford to relax your own vigilance in scanning for other aircraft; it simply means that you are getting some extra help from radar scans. Almost all air carrier traffic is IFR, for example, and these would be obviously separated from you, but there could be other aircraft in the area which are not in contact with approach control.

Unknowns are a real problem to the controller. If they are transitting the area at a low altitude they may not show up clearly, or at all, on the radar scope. If they do show up the controller has no way of contacting the pilot, and unless the aircraft has an altitude-encoding transponder functioning there is no way to know its altitude. Even when the altitude is transmitted by a transponder, the controller is unable to verify this information with the pilot, so the most he can tell other pilots is that there is "possible conflicting traffic, your altitude, unverified." The VFR pilot who makes himself known to approach/departure control is making an important contribution to flight safety, without burdening himself in any way with additional flight duties.

LOOK OUT FOR DETOURS

Some pilots have the impression that if they contact approach control when making a VFR approach to land they will be routed over a long, roundabout course, and possibly delayed in order to accommodate air carrier traffic. Normally all vectoring of aircraft is done for the purpose of accomplishing an orderly, safe flow of traffic, not to favor certain aircraft. Understand that the controller is dealing with a great variety of aircraft of many different sizes and speeds, coming from a variety of directions. The apparently meaningless detour you may be asked to make could be for the purpose of assuring separation from high performance traffic which are still many miles distant and as yet invisible to you. If you feel strongly about complying with a vector from approach control you can always decline it. But you should advise the controller of your intentions.

While the full range of VFR radar advisory services are available only at the 132 designated Terminal Radar Control Areas, limited services are provided at an additional 113 approach/departure control facilities (essentially traffic advisories and sequencing). These are identified, with their frequencies, in the Airport Facility Directory, an FAA publication normally available for inspection at flight service stations or for sale by fixed base operators.

However, pilots who do not have this information are at liberty to contact any control tower along their route and ask for the frequency of the facility having approach control jurisdiction. (In some areas approach

APPROACH CONTROL SURVEILLANCE IS NOT NORMALLY PROVIDED:

1) Within the airport traffic area or area of local control.
2) After a pilot acknowledges sighting the aircraft he is sequenced to follow. (Make certain you have the correct target, and inform approach control immediately if contact is lost.)
3) For "unknowns" which may or may not show up on the radarscope.
4) For weather avoidance.

CAUTION: It is your responsibility as a pilot to decline vectors which might render it impossible for you to maintain VFR weather conditions or safe separation from terrain obstacles or other aircraft. The pilot is always responsible for the operation of his aircraft.

control is provided by an En Route Air Traffic Control Center, instead of from a terminal. Airports with FAA control towers are shown in blue on sectional charts.)

The block of airspace delineated in purple on the sectional chart as a TRSA has the familiar shape, like the TCA, of a round upside down wedding cake; with a narrow core extending from the surface up to the ceiling, usually about 8,000 feet, and concentric layers extending out from the center to a maximum width at the ceiling of about 25 nautical miles. The same separation and sequencing services provided in a TCA are given in a TRSA but the area cannot be considered as being under positive control because of the possible presence of non-participating aircraft.

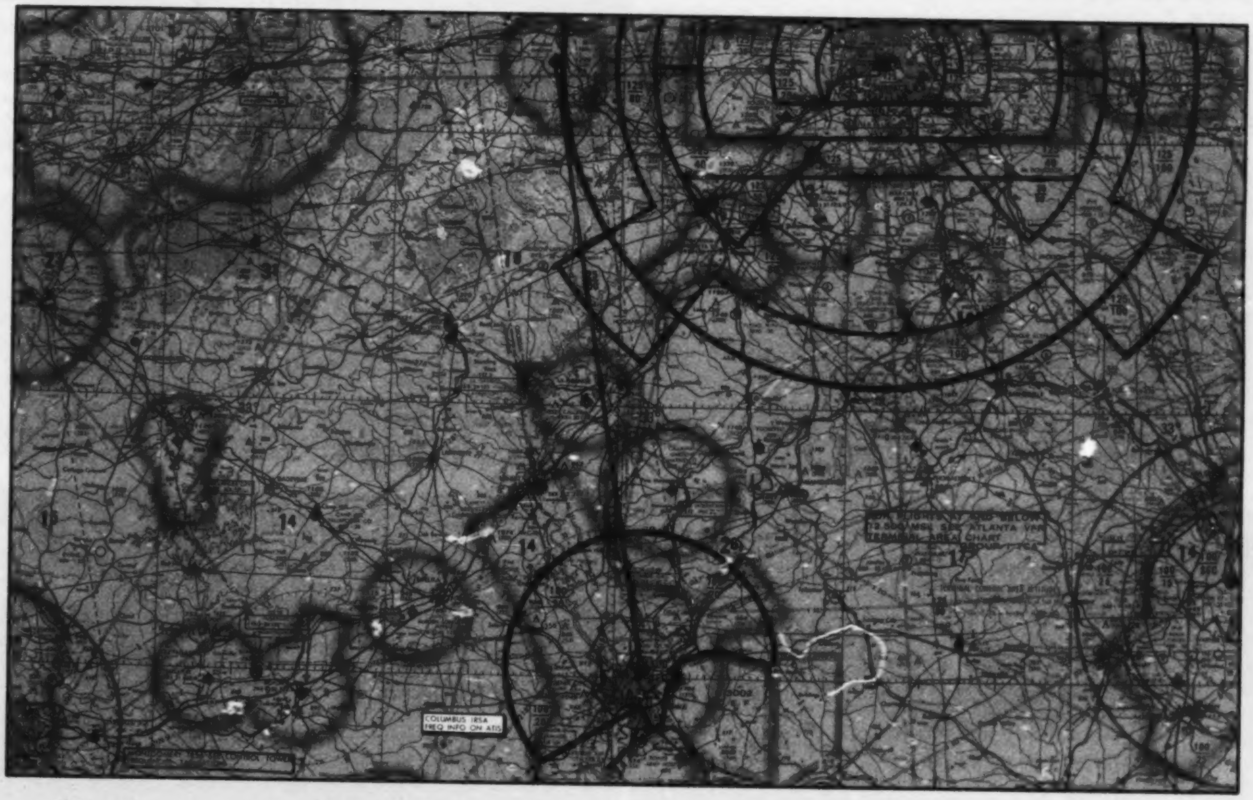
Unlike the TCA, the purple boundries *do not fence out any aircraft*, regardless of equipment or pilot certification. Any pilot is free to disregard the TRSA boundary lines, and navigate on his own. However, the purple lines indicate an area of heavy traffic including air carriers, where FAA has considered it advisable to install additional surveillance equipment and additional personnel for the express purpose of providing radar separation for VFR aircraft. In the 10 year history of TRSAs, no midair collisions have taken place between aircraft when both were being worked by approach/departure control.

DEPARTURE PROCEDURES

VFR pilots departing a TRSA are encouraged to contact clearance delivery before taxiing and to state their intentions, which will be relayed to departure control. After taking off they will be advised to contact departure control on a given frequency, and the departure controller, already familiar with their intentions, will be able to assist them along their way through this segment of the airspace as speedily and directly as possible. Note that when being vectored by approach/departure control a pilot does not have to comply with the altitude requirements of FAR 91.109, but will be advised when to resume compliance. Departing pilots will be informed when departure control services are being terminated. Similarly, inbound pilots, when advised to contact local control, should realize that radar surveillance is terminated. Some tower cabs have radarscopes, but local control depends primarily on visual and radio contact.

Here again, even if the pilot elects to navigate to cruise altitude on his own, the fact that his intentions are known will help controllers and pilots maintain safe traffic separation throughout the TRSA area.

VFR is fine, when the weather permits. But UFO's anywhere near a major airport spell trouble. Make yourself known. ■



A pilot intending to depart West Georgia Regional Airport, near Carrollton, Ga, on a southerly VFR flight to Columbus, Ga. would have reason to be concerned about the busy flow of jet traffic departing or approaching Hartsfield/Atlanta Airport. Although his course would keep him just outside of the Atlanta Terminal Control Area (blue lines), nevertheless the adjoining airspace is heavily travelled by aircraft. The pilot could enhance the safety of his flight by contacting Atlanta approach control, giving his intentions, and asking for radar advisories.

Even if the TCA controllers were unable to comply, because of numerous aircraft utilizing the TCA, safety would be improved by the fact that the transiting plane would not be an unknown. In any event, shortly after becoming airborne the pilot could contact approach control at Columbus, which has a Terminal Radar Service Area (purple lines) expressly designed to assist VFR pilots. Although complete TRSA services for traffic separation, vectoring and sequencing to land do not begin until the perimeter of the TRSA is reached, radar advisories concerning traffic may be used well beyond that point.

Approach control frequencies are available from the taped airport traffice information service (ATIS) or from the tower or flight service station.

Don't Give Up the Ship!

Gear-Down Ditchings at Sea are Survivable

For a total non-swimmer Toby Alvis had flown over a lot of ocean—many thousands of miles of Pacific Ocean, in fact. He had experienced a few spots of trouble in route, but never anything serious enough to get his feet wet. On this occasion, however, he was outbound from California and a good 500 miles short of the beach at Waikiki when he realized that a ditching was inevitable. The electrical pump that boosted fuel from the reserve tank in the cabin to mains had broken down. All efforts to repair the pump were futile. There was no help for it but to radio for help, keep flying normally meanwhile, and review the ditching procedures.

Toby had ample experience to reflect upon. An ex-farm boy from near Bloomington, Il., he had logged some 500 combat flight hours with the Marines in Vietnam. After four years of service he had settled down in southern California, up-graded his flying ratings and taken up ferrying aircraft across the Pacific. During four years with Southern Cross Aviation, which specialized in ferrying singles and twins to Australia, Toby had heard and told his share of stories about survival at sea in a light plane. Now, for the first time, he was facing a real-life situation.

In his favor was the presence of the S.S. Manulani, a Honolulu-bound freighter, which had been alerted to his situation by the Coast Guard and which had steamed to his reported position. On sighting Toby's 185, the captain stopped his ship dead in the water and put over a lifeboat. Rescue was at hand, provided that the ocean depths or sharks did not get him first.

Toby was well aware of the prevailing belief that his best chance for survival was in a low wing airplane with retracted gear. Gear-up gave you an opportunity to slide into the water with a belly landing, and the low wing gave you better buoyancy than the high wing. His Cessna 185 had fixed gear and a high wing and, of course, he could not swim a stroke.

After some worrisome hesitation, Toby made up his mind to "follow the book" and take his chances while he still had power. Following a mental checklist he donned his life jacket, tightened his restraint harness, opened the cabin door, and locked the latch so that it could not become jammed shut if the fuselage were damaged on impact. He padded the instrument panel with his suit jacket to protect his face, in case his harness tore loose, signaled to the lifeboat, and began his descent.

The ocean surface showed him a ten-foot swell, and he estimated the winds at 10–15 knots—appropriate conditions for a landing parallel to the water movement, according to the book. He lined up with the swells and aimed his nose at a point halfway between the lifeboat and the freighter. He made his approach with full flaps and at minimum above-stall speed, cut his power and eased back on the wheel. The airplane plopped down on the next crest. He never recalled the actual splash-down, he only knew that suddenly "there was green water all over the windshield." The nose tipped down, but only momentarily and then the aircraft righted itself. Over his headset he could hear the Coast Guard pilot's voice asking the ship, "Is he still alive?"

That he was, but with the cockpit rapidly filling with water his anxiety about drowning took hold, and instinctively he inflated his life jacket. This departure from reccommended procedures cost him an agonizing few seconds of struggle to get out the door. When he finally worked himself free, the airplane had already sunk so low in the water that he had to pull himself around from under the wing before he could rise to the surface. The waves looked enormous and he was reluctant to paddle away from the airplane. He was hit by the wing at least three times before the lifeboat crew plucked him out of the sea. He still had his boots on.

His plane sank out of sight within 15 minutes of impact. With it went his suitcase and all his good clothes, a brand new camera and his ancient weatherbeaten straw hat. He felt bad about the hat, but all in all pretty lucky. The comforting sight of the freighter standing by gave him the impression, "God must be saving me for something big."

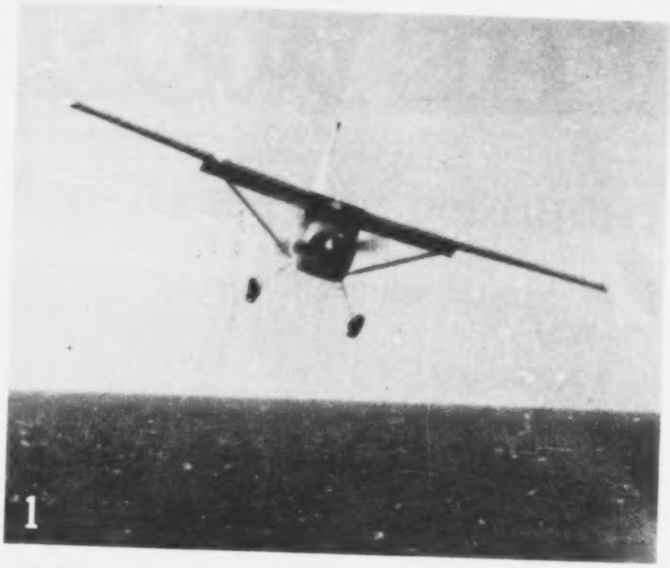
Uninjured, Toby emerged from the experience with a cheery optimism about ditching survivability with fixed gear. In fact, he concluded that if he had it to do again and was in a retractable, he would probably put the gear down, particularly in rough water. He theorized,

"The extended gear will help drag you to a smooth, quick stop. With a tri-gear, I'd certainly put the gear down, because the main wheels are far enough aft of the center of gravity so that you'd be fairly well slowed down beforer the nose gear dug in. With the gear up, if you bounce off a wave and back up into the air, there's a very good chance that when you hit again the nose will be so far down you'll go right under and never stop.

"As for the high wings, well, the plane may settle lower, but at least you can slow down your approach with full flaps without worrying about slewing around in the water."

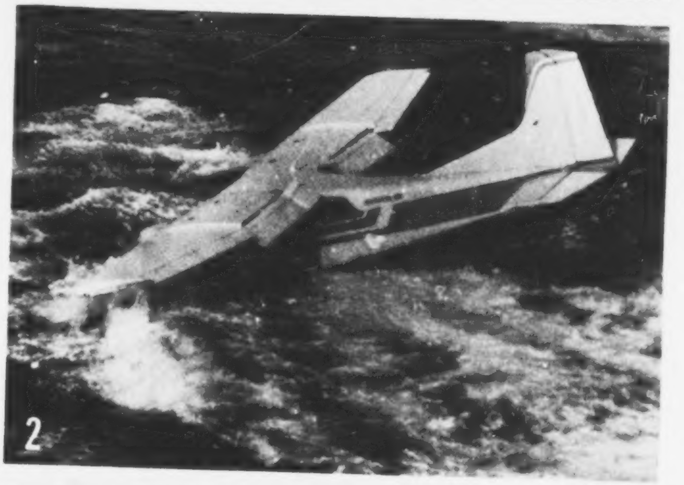
Interestingly enough, statistics on ditching give some credence to Toby's theories. A review of ditching accidents reported by the National Transportation Safety Board for the three-year period 1976–1978 shows 104 light plane ditchings. About half (54) of these were made with retracted gear, but retractables accounted for 65 percent (15 out of 23) of the fatal accidents. Factors other than gear position would have to be studied carefully before any conclusions could be drawn from this brief review, but there is enough evidence on hand to dispell any notion that fixed gear and high wings will necessarily drag you down to Davy Jones' locker.

Someone may have something big in mind for you. *Don't give up the ship!* ■



1

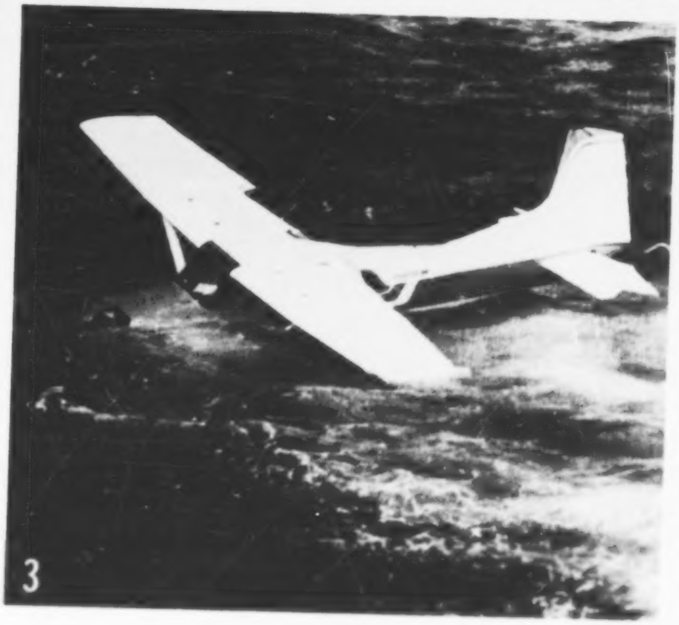
Ditching Sequence: Toby brings the 185 down with full flaps (1) and (2) the nose tips over on impact. The airplane stays afloat (3) until Toby can exit, carrying a life preserver as well as wearing a life jacket (4). SS manulani life boat crew pulls him safely on board (5) after 10 minutes in the water.



2

(The Coast Guard in its publication, "Aircraft Emergency Procedures over Water," recommends that retractable gear be left up, because if down it can result in a "violent and rapid deceleration" and subsequent loss of control—which can flip the aircraft over or cause it to dive into the water. The Coast Guard also notes that "low-wing aircraft, due to the flotation support derived from the wings, are safer for ditching than high-wing types. The high-wing aircraft tends to sink rapidly after impact until the wings settle in the water.")

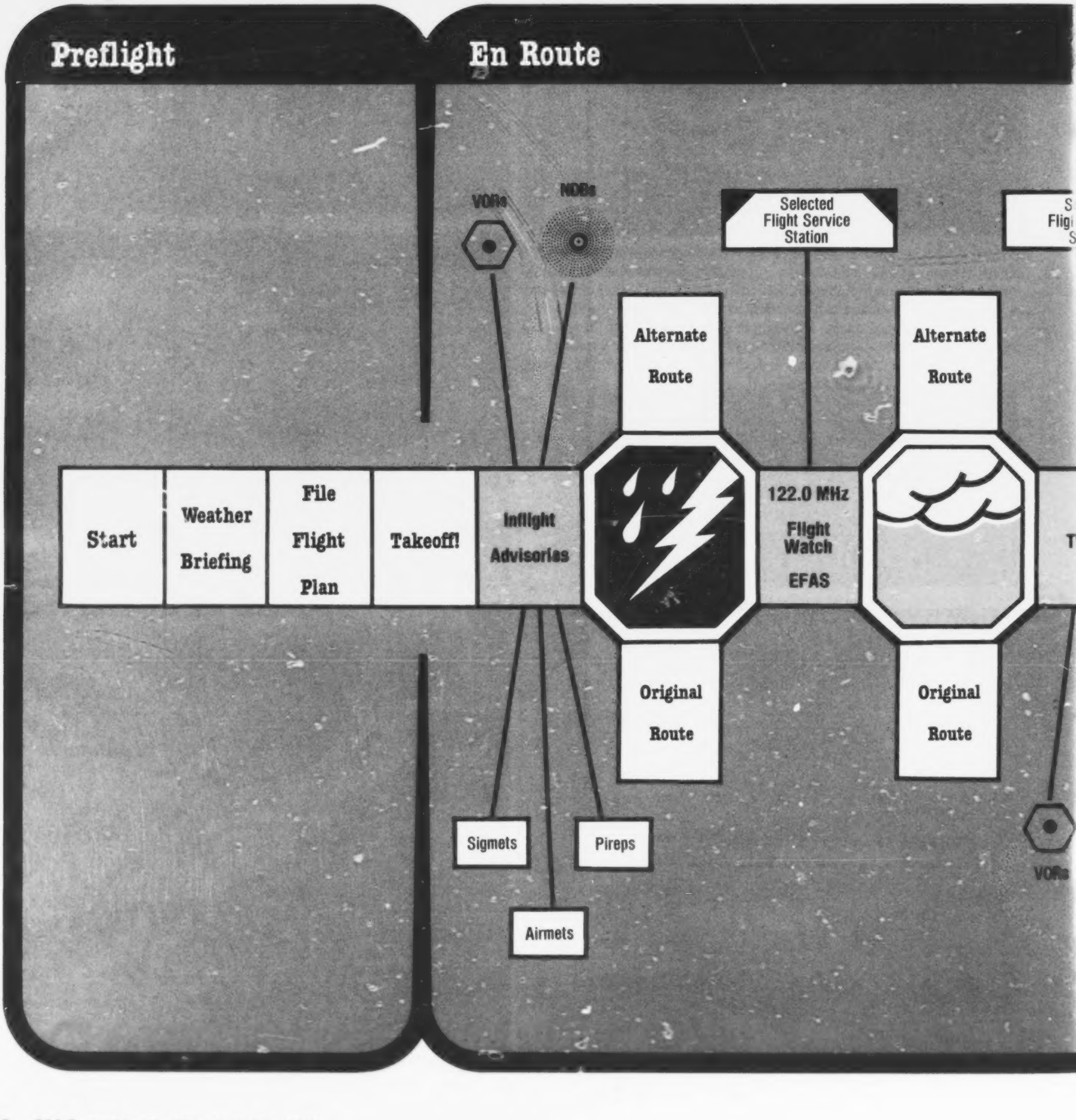
4



3

THE WEATHER GAME

Getting there from here, simplified into an enjoyable pastime for adults


Preflight
En Route
VORs
NDBs
Selected Flight Service Station
Alternate Route
Alternate Route
Start
Weather Briefing
File Flight Plan
Takeoff!
Inflight Advisories
122.0 MHz Flight Watch EFAS
Original Route
Original Route
Sigmets
Pireps
Airmets
VORs

RULES OF THE GAME

1) **START.** To enter this square you need a current medical, a pilot certificate, student to ATP, and an airworthy aircraft, freshly preflighted.

2) **WEATHER BRIEFING.** Contact nearest flight service station by telephone or in person. If weather is favorable, proceed to

3) **FILE FLIGHT PLAN.** File in accordance with weather briefing. Estimate range with fuel on board, considering winds aloft forecast. Stow current charts at hand. **Take off!** Proceed to

4) **FLIGHT ADVIRSORIES.** Check these after you reach cruise altitude, or whenever you observe worsening weather ahead. Monitor your radio for SIGMETS (significant meteorlogical information), AIRMETS (airman's meteorlogical information) or PIREPS (pilot reports).

SIGMETs and *AIRMETs*. SIGMETs forecast or report on the existence of tornadoes, thunderstorms, hail, severe and extreme turbulence, severe icing, and widespread dust or sand storms that lower visibility to less than three miles. AIRMETs concern less severe conditions, such as moderate icing, moderate turbulence, sustained winds of 30 kts or more at the surface, widespread areas of lowered ceilings (less than 1,000 feet) and reduced visibility (less than three miles), and obscuration in mountainous areas.

SIGMETs and AIRMETs are broadcast by a FSS or NAVAID every 15 and 45 minutes after each hour; however, during their first hour of validity, SIGMETs are broadcast every 15 minutes. NAVAIDs with voice capability are identified on sectional charts by a line under the frequency.

Pilots who have missed possible SIGMETs or AIRMETs may request them at any time from a flight service station.

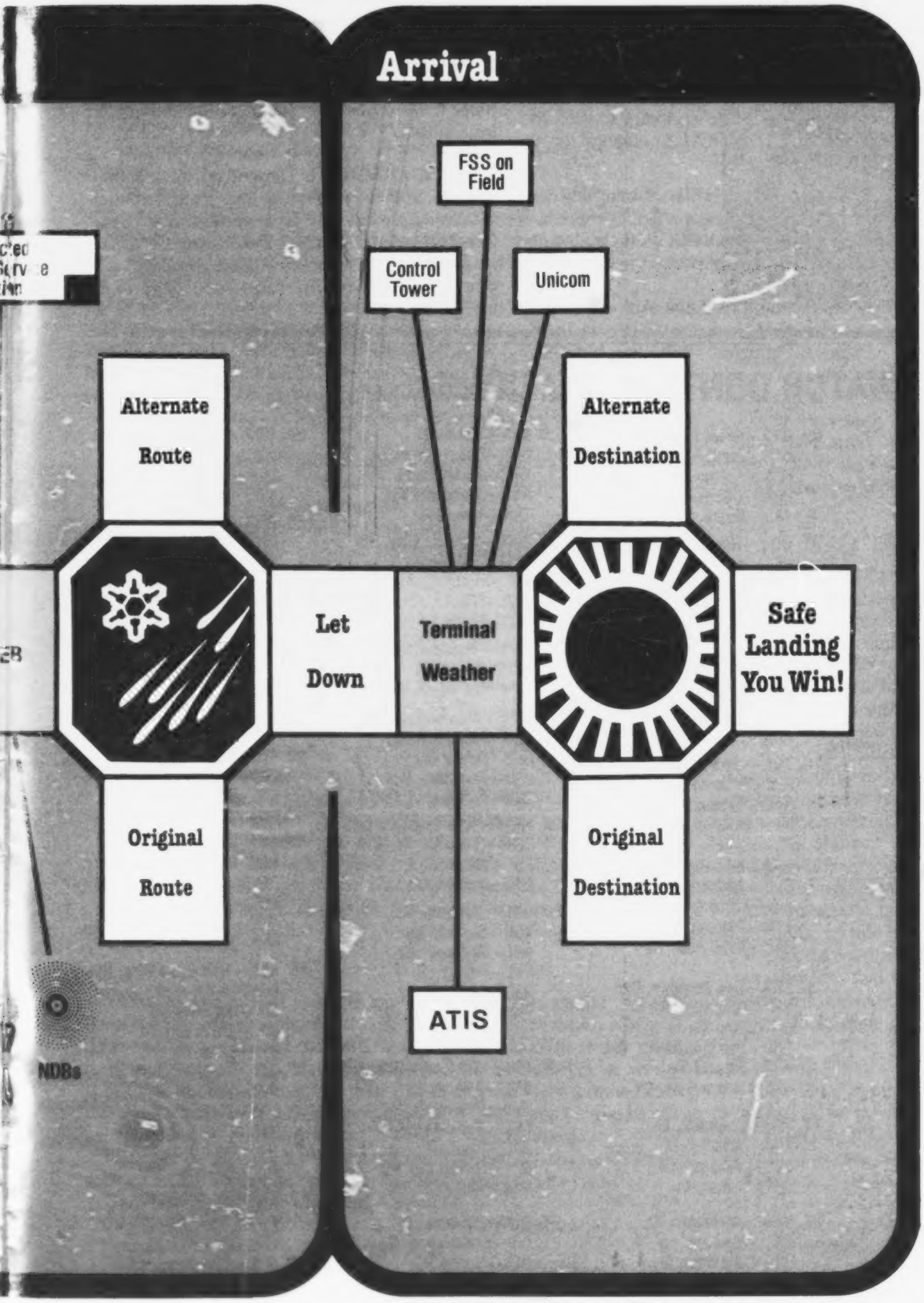
Pilot Reports. If the flight is being conducted with a ceiling below 5,000' with visibility at or below five miles or if there are thunderstorms forecast or reported, the player should request PIREPs from the nearest FAA ground facility or remote transmitter concerning weather encountered by other pilots along the player's route or proposed alternate. PIREPs contain information on height of cloud tops, height of upper cloud layers, thunderstorms, icing, turbulence, or strong winds. The player may also be asked to volunteer his own pilot reports of weather observed en route.

4A) **ORIGINAL ROUTE.** If weather conditions along his route are favorable, the pilot continues along his original route.

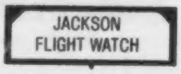
4B) **ALTERNATE ROUTE.** If weather conditions exceed the pilot's capabilities, the player selects an alternate route and destination and notifies the flight service station of the change in his flight plan.

5) **FLIGHT WATCH.** Whenever the player passes near a flight service station with En Route Flight Advisory Service (EFAS), known more commonly as "Flight Watch," he can tune to 122.0 MHz to request live advisories on weather along his specific route and at his altitude. A specialist at an FSS with Flight Watch provides this information to the player based on reports from other pilots, radar reports, and forecasts from weather facilities.

Flight service stations with Flight Watch are indicated on sectional charts by triangles in the upper left and right corners of their information boxes. Note: The nation-wide Flight Watch frequency, 122.0 MHz, will not be indicated in the information box. ⟶



Each Flight Watch Station on the chart has a number of remote stations that can link the player to the Flight Watch specialist. Such a remote facility will be designated on VFR charts this way:

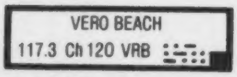


If the player does not know the name of an FSS having Flight Watch in his area, he may simply ask for "Flight Watch" on 122.0 and give his position. Nearly always the appropriate FSS will respond.

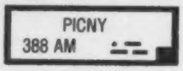
Advisories received from Flight Watch will confirm the decision whether to continue on the ORIGINAL ROUTE or to assume an ALTERNATE ROUTE.

6) **TWEB** (as in tweet). As the flight proceeds, the player can tune to a selected ground station to hear continuous taped "Transcribed Weather Broadcasts" (TWEB). NOTAMs (Notices to Airmen), PIREPs, radar reports, and winds aloft data are provided on the tapes as well as a forecast for the general receiving vicinity and weather observed at specific points within a 400-mile radius of the central broadcasting point. Changes in the weather are transcribed as they are observed.

Flight service stations and VORs with TWEB are indicated on VFR charts by a small blue square on the inside lower right corner of the box containing the name and frequency information:



An NDB with TWEB has a magenta square inside its information box:



After listening to TWEB information, the player can still decide to continue toward the ORIGINAL DESTINATION or change to an ALTERNATE.

7) **TERMINAL WEATHER.** Nearing his destination, the player contacts a flight service station, control tower, or UNICOM (in that order of preference) on the airport to learn landing conditions.

High activity airports have Automatic Terminal Information Service (ATIS), which provides ceiling and visibility (if they are less than 5,000' and five miles respectively), obstructions to visibility, temperature, wind direction and speed, altimeter setting, and any other information pertinent to the airport (runway in use, instrument approach in use, etc.). The recorded ATIS information is broadcast over a VOR associated with the airport or over a discrete VHF–UHF frequency. Airports with ATIS are indicated in the Airport/Facility Directory and on sectional charts.

(Some airports have, as a permanent facility or as a test, automatic weather observing equipment which broadcasts terminal weather. The player should check AIM or NOTAMs to determine if his destination has such an automatic installation.)

8) **SAFE LANDING.** Depending upon information received en route and from terminal weather sources, the player moves to a "Safe Landing" at the Original Destination or either at the Alternate. Once in "Safe Landing"—if you have followed the rules—you have won the game! ■

FLIGHT WATCH CONTROL STATIONS

1. **ABQ—Albuquerque, NM**
   - GUP—Gallup, NM
   - LVS—Las Vegas, NM
   - 8DM—Davenport Mountain, NW
2. **AGC—Pittsburgh, Pa**
   - AKR—Akron, Oh
   - CMH—Columbus, Oh
   - IPT—Williamsport, Pa
3. **ALW—Walla Walla, Wa**
   - PDT—Pendleton, Or
   - SFF—Spokane, Wa
   - 4CW—Cottonwood, Id
4. **ATL—Atlanta, Ga**
   - CHA—Chattanooga, Tn
   - GSP—Greer, SC
   - TYS—Knoxville, Tn
   - VNA—Vienna, Ga
5. **BHM—Birmingham, Al**
   - MGM—Montgomery, Al
   - MSL—Muscle Shoals, Al
6. **BOI—Boise, Id**
   - GNG—Gooding, Id
   - REO—Rome, Or
   - 4EM—Squaw Butte, Id
7. **BOS—Boston, Ma**
   - HYA—Hyannis, Ma
   - MLT—Millinocket, Me
   - PWM—Portland, Me
8. **BUF—Buffalo, NY**
   - SYR—Syracuse, NY
9. **CHI—Chicago, Il**
   - CMI—Champaign, Il
   - GRB—Green Bay, Wi
   - MSN—Madison, Wi
10. **CHS—Charleston, SC**
    - CAE—Columbia, SC
    - JAX—Jacksonville, Fl
    - SAV—Savannah, Ga
11. **CPR—Casper, Wy**
    - BIL—Billings, Mt
    - MLS—Miles City, Mt
    - THP—Thermopolis, Wy
12. **CRW—Charleston, WV**
    - HMV—Holston Mountain, Tn
    - LEX—Lexington, Ky
13. **DCA—Washington, DC**
    - ENO—Kenton, De
    - LDN—Linden, Va
    - LYH—Lynchburg, Va
    - PHF—Newport News, Va
14. **DEN—Denver, Co**
    - ASE—Aspen, Co
    - GLB—Goodland, Ks
    - LHX—La Junta, Co
    - OGA—Ogallala, Ne
    - SBS—Steamboat Springs, Co
15. **DET—Detroit, Mi**
    - BTL—Battle Creek, Mi
    - MQT—Marquette, Mi
    - TVC—Traverse City, Mi
16. **DSM—Des Moines, Ia**
    - BDF—Bradford, Il
    - CID—Cedar Rapids, Ia
17. **ELP—El Paso, Tx**
    - FST—Fort Stockton, Tx
    - GDP—Guadalupe Pass, Tx
    - ROW—Roswell, Tx
18. **FTW—Fort Worth, Tx**
    - ABI—Abiline, Tx
    - PRX—Paris, Tx
    - SPS—Wichita Falls, Tx
    - TPL—Temple, Tx
19. **GFK—Grand Forks, ND**
    - DIK—Dickinson, ND
    - JMS—Jamestown, ND
    - MOT—Minot, ND
20. **GTF—Great Falls, Mt**
    - BTM—Butte, Mt
    - FCA—Kalispell, Mt
    - GGW—Glasgow, Mt
    - 4AS—Ashton, Id
21. **HON—Huron, SD**
    - PIR—Pierre, SD
    - RAP—Rapid City, SD
22. **HOU—Houston, Tx**
    - LCH—Lake Charles, La
    - LFK—Luffkin, Tx
    - PSX—Palacios, Tx
23. **IND—Indianapolis, In**
    - EVV—Evansville, In
    - FWA—Fort Wayne, In
24. **JAN—Jackson, Ms**
    - ELD—El Dorado, Ar
    - GWO—Greenwood, Ms
    - MEI—Meridian, Ms
25. **LAS—Las Vegas, Nv**
    - BLD—Boulder City, Nv
    - ILC—Wilson Creek, Nv
    - TPH—Tonopah, Nv
    - 4AP—Angel Peak, Nv
26. **LAX—Los Angeles, Ca**
    - BFL—Bakersfield, Ca
    - JLI—Julian, Ca
    - SBP—San Luis Obispo, Ca
    - 4BT—Barstow, Ca
    - 4SK—Saddle Peak, Ga
27. **LBB—Lubbock, Tx**
    - AMA—Amarillo, Tx
    - CDS—Childress, Tx
    - DHT—Dalhart, Tx
28. **MEM—Memphis, Tn**
    - BNA—Nashville, Tn
    - LIT—Little Rock, Ar
    - MAW—Malden, Mo
29. **MIA—Miami, Fl**
    - CTY—Cross City, Fl
    - FMY—Ft. Myers, Fl
    - MLB—Melbourne, Fl
    - TPA—Tampa, Fl
30. **MKC—Kansas City, Mo**
    - EMP—Emporia, Ks
    - IRK—Kirksville, Mo
    - 3NA—Natoma, Ks
    - 2K5—Marysville, Ks
31. **MPV—Montpelier, Vt**
    - ALB—Albany, NY
    - BTV—Burlington, Vt
32. **MSP—Minneapolis, Mn**
    - AXN—Alexandria, Mn
    - DLH—Duluth, Mn
    - EAU—Eau Claire, Wi
    - OTG—Worthington, Mn
33. **NEW—New Orleans, La**
    - CEW—Crestview, Fl
    - ESF—Alexandria, La
    - MOB—Mobile, Al
34. **OAK—Oakland, Ca**
    - BSR—Sig Sur, Ca
    - AND—Anderson, Nv
    - FAT—Fresno, Ca
    - RBL—Red Bluff, Ca
    - SAC—Sacramento, Ca
    - 4FR—Ferndale, Ca
35. **OKC—Oklahoma City, Ok**
    - ANY—Anthony, Ks
    - BVO—Bartlesville, Ok
    - FSM—Fort Smith, Ar
    - GAG—Gage, Ok
    - GCK—Garden City, Ks
    - MLC—McAlester, Ok
36. **OMA—Omaha, Ne**
    - GRI—Grand Island, Ne
    - OFK—Norfolk, Ne
    - SUX—Sioux City, Ia
37. **PDX—Portland, Or**
    - EUG—Eugene, Or
    - DLS—The Dalles, Or
    - MFR—Medord, Or
38. **PHX—Phoenix, Az**
    - INW—Winslow, Az
    - 4GL—Globe, Az
    - 4ML—Mt. Lemmon Az
    - 4SG—Seligman, Az
    - P01—Ajo, Az
39. **RDU—Raleigh/Durham, NC**
    - EWN—New Bern, NC
    - ILM—Wilmington, NC
    - INT—Winston-Salem, NC
40. **SAT—San Antonio, Tx**
    - HRL—Harlingen, Tx
    - LRD—Laredo, Tx
    - RSG—Rock Springs, Tx
41. **SEA—Seattle, Wa**
    - NUW—Whidby Island, Wa
    - SMP—Stampede Pass, Wa
    - TDO—Toledo, Wa
    - 4LM—Larch Mountain, Wa
    - 4MI—Mission Ridge, Wa
42. **SLC—Salt Lake City, Ut**
    - BAM—Battle Mountain, Nv
    - BPI—Big Piney, Wy
    - CDC—Cedar City, Ut
    - DTA—Delta, Ut
    - GJT—Grand Junction, Co
    - HVE—Hankville, Ut
    - LWL—Wells, Nv
    - RKS—Rock Springs, Wy
    - 4DL—Delle, Ut
    - 74V—Roosevelt, Ut
43. **STL—St. Louis, Mo**
    - SGF—Springfield, Mo
    - VIH—Rolla, Mo
44. **TEB—Teterboro, NJ**
    - HVN—New Haven, Ct

ALICE IN NEANDERTHAL LAND

Flight Training Viewed by the Gentle Sex

I came into the flight school office with that ad I had torn out of a newspaper in my hand, and I laid it down on the counter. No one paid any attention. Finally, a man came over behind the counter and picked up the ad. He cocked an eye at me. "You're interested in flying?"

I felt like saying, *"Oh, no, not me, Mister. I drove all the way out to your sweet little airport just to find out which way the wind was blowing,"* but all I could muster was a timid, "Yes, sir."

"When were you thinking of going up?"

"Ten minutes ago, when I got here. I had an appointment. My name is Alice."

"Oh, sure, the schoolteacher. I remember now. We'll have someone with you right away. I thought maybe you were with someone."

He went to the field-side door and spoke to three men who sat in the sun, their feet up on a rail. "Hey, who wants to take this young lady up for an intro?"

The words "young lady" seemed to stir up some interest. In a few minutes I was being escorted to the flight line by a gangling young man in cowboy boots, blue jeans, and a ski vest—a sort of latter day Lindbergh, if you stretched your imagination and believed his stories. As we were getting into the airplane I asked him if he wasn't going to preflight.

"I looked around while we were chatting. Say, how do you know about preflights?"

I told him I had completed ground school, and asked if he wasn't going to check the fuel.

"Already did that this morning."

"Couldn't moisture condense in the tanks on a warm day like this?"

"Well, not enough to hurt you, honey. Say you're pretty smart about airplanes for a schoolteacher. You sound like you're serious about this."

I explained I was very serious about learning to fly, it was important to my budding career as a journalist, and could we get started? Bill smiled and patted my hand. Once we were straight and level, he demonstrated some turns and stalls. The next thing I knew we were back in the pattern. I thought he was going to show me some landing techniques, but he turned off at the first intersection and taxied straight back to the ramp.

"How'd you like your first hour?" the school manager said.

"Actually it was only 0.4 on the Hobbs. Your ad said $10 for a one-hour introductory lesson."

"Say, you *are* serious about flying. Okay, when you come out again, we can set you up for an hour, two hours, whatever you want."

I said I would think about it, and he gave me an I-thought-so look. I gave him his $10 and left. I knew they weren't making money on an intro for $10 and they got hit by a lot of joy-riders, but if they didn't live up to their ad's promise, how could I trust their flight training? There has to be a flight school where I don't have to prove how serious I am.

12–7–79

There is! The school I visited today practically ran up the flag when I walked in. The receptionist showed me to a "flight desk" where she gave me an armful of brochures, a cup of fresh coffee, and a lengthy form to fill out. The polite instructors and the clean airplanes were all sporting the school emblem on their jackets and tails—respectively. Filling out the registration form, however, I felt as if I were applying for a credit card. Couldn't I pay by the hour, I asked the receptionist.

"We like you to pay half of the tuition in advance," she said. "It saves a lot of embarrassment. Paying by the hour can be awkward."

Better awkward than bankrupt, I thought.

I told her I had already taken ground school and asked what happened if I qualified in less than the average time.

"We like to process our people in our own way, but there might be some adjustment."

I began to feel uneasy so I asked to meet my instructor. I was told my instructor would be whoever was available whenever I came out; all were fully competent. I decided to leave, saying I would have to consult my accountant.

Their lump-sum fee itself didn't bother me as much as the feeling of being "packaged." No, I am not looking for a personal involvement, but then neither do I want an automated, drive-in, check-out, punch-the-button arrangement. I am a real live person, with feelings.

12–10–79

I've found it—I think. The airport doesn't look like much. The road coming out felt like an exploded mine field and the tired old buildings looked like an abandoned wartime training base of many wars ago. But the people make all the difference—one big, happy family, all interested in one another and in any stranger who comes by. And they assume that anyone who wants to fly has perfectly good reasons for doing so and doesn't have to justify them.

"Just getting started? Oh, you'll love it!" was the reaction I got all around. These are my kind of people.

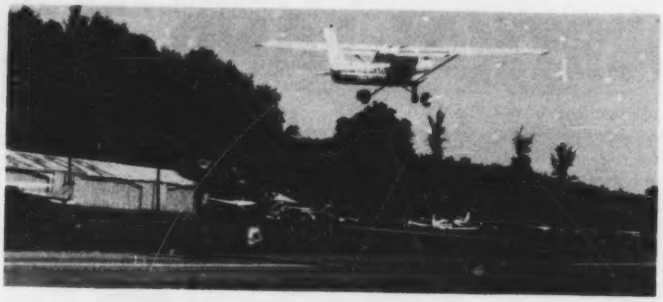
Tim, the instructor assigned to me, made a point of explaining he was not a full-time professional pilot but a county deputy sheriff who instructed because he loved to fly and enjoyed teaching others. He is a big rock of a man in his early 30's, easy-going but with a look of restrained authority. He took me out on the porch and pointed out that the field had a few idiosyncrasies: the wind never blew straight down the runway, which was a little crooked, and most of the airplanes were far from new. But anyone who learns to fly here will be used to less than optimum conditions, so that is a plus.

We exchanged a little background, so we wouldn't be two strangers crammed into that little trainer. He is ex-Air Force, is deeply interested in law enforcement, also has a wife, a kid, two dogs, and a stray cat. Never would have guessed.

12–15–79

Around the airplane I noticed some of Tim's easy-going manner disappears. At least he was more attentive to details, more organized and methodical than I would have thought. I had to tell myself, *He's not less interested in me, he's just responding to his responsibilities.*

The first preflight, which for Tim meant going over a list of some 40 separate items, took more than half an hour. Before it was over, I was hopping with impatience to be up in the air. But Tim continued in his same unhurried manner, explaining in detail how each component worked, how it might malfunction, what could happen to me if it did. I must have heard a dozen anecdotes about crashes that occurred because



the pilot had not noticed a missing safety wire, a spot of oil, or a bulge in the airfoil.

"Tim," I said finally, "the first time your instructor went up with you, did he spend this much time on preflight? Or are you doing this because I'm a girl?"

"No, I was in the military. We all knew our necks would be on the line when we went up in those birds. In civilian flying, people take a lot for granted."

"Don't you get bored standing around waiting for me to finish?"

"Not as bored as I'd get standing around at your funeral."

1–23–80

It took a while, but I have shed my teacher's mantle and now fit into this new student role comfortably. I study like crazy and dash out to the airport full of confidence, which fades at my first gaffe, but returns slowly in response to Tim's steady encouragement and unflappability. His teaching philosophy is to avoid criticizing by word or expression—who needs it?—but always to focus attention on what has to be done. He likes to explain the theory of each procedure before demonstrating it, and he is full of praise for my "quick mental grasp." High praise!

1–28–80

Today, I learned to do coordinated turns, first shallow, then medium, then steeper, and I love it. Later, some stalls. Sometimes the break is so soft and the buffet so slight, I can hardly tell I'm stalled. S-turns over a road are great fun. Slow flight, climbing and descending turns, some rudiments of navigation. Each new skill brings more confidence and delight.

2–7–80

A dismal day, weather-wise, off and on rain, so we stay in the pattern, and I make some bumpy landings, with and without Tim's help. Gusty winds could be the problem, so I don't worry yet. But taxiing back, I tried to turn off the runway with the wheel instead of the rudder pedals and bottomed out the nose gear in a small pothole. At least the prop suffered no damage. I'm embarrassed. I know perfectly well that turning the wheel will not turn the airplane on the ground.

Tim says I try to do things too much in my head, that I should learn to feel what is happening. That's not the problem, I tell him. I can't push the pedals all the way down, even with my seat as far forward as it will go—my legs are not long enough. *Why didn't I say so?* He produces a cushion from back in the plane, and I'm suddenly relaxed—such a simple solution.

2–15–80

The last two hours went by so beautifully I see I didn't put anything down. Felt like I owned the sky. Today was good, too, after that business with the fuel cap. For some reason on the preflight, I can't unscrew the cap on the left wing. No matter how hard I try, I can't budge it. I debate whether or not to go ask for help. It's bad enough I need a ladder to reach the wing when all Tim does is stretch up.

When I appear in the lounge he asks me what was wrong and I tell him. Another instructor rolls his eyes heavenward and murmurs, "Female students!" I felt like telling him I had to help *his* puny male student push his airplane back off the parking area the day before. Tim takes me by the arm and heads me back to the airplane. "Sour grapes," he says, and everything is cool again.

2–27–80

Today Tim said we would be staying in the pattern to practice takeoffs and landings. For some reason, my landings are not coordinated with Mother Earth. Perfect flare and a full-stall drop-out, but much too high off the ground. God help the landing gear and the earthworms!

3–2–80

Do I have a thing about landing?

3–5–80

I do have a thing about landing. Today we stayed in the pattern again: progress, zero. Maybe I need new glasses; my eyes could be getting worse.

3–11–80

It's not my eyes. It's me, some demon in my head that doesn't want to learn to land. Tim is patient as ever, but he must be disappointed. I know I am. People keep asking me when I'm going to solo, and I'm running out of excuses.

3–15–80

Today Tim was absent, replaced "temporarily" by Margie, the school's one female instructor. I feel uneasy with her. Are they trying to tell me something? I know Margie has logged tons of hours ferrying aircraft all around the world, but I don't relate well to her. *Resentful?* Maybe. I don't say much, and neither does she, at first.

I execute the maneuvers she asks for, and for some inexplicable reason, I make a splendid landing—flared just right and touched down softly. Then came the flight evaluation: "You're doing fine. You know what to do up there, and you've got all the motor skills."

"I don't think Tim would agree with you."

"Sure he would. I've talked to him. He's a big strong guy but he's no Neanderthal type. He knows good flying."

"He's worked so hard with me. How come I could land okay with you in the cockpit and not with him?"

"Maybe because I'm a woman. You don't have to impress me."

"I didn't think that made any difference in training."

"Sometimes it does, in the beginning. You could be so busy thinking about how Tim is reacting to your flying that you don't keep your mind on what you're doing. And maybe he's so concerned about safeguarding your fragile feminine bones that he gives off the wrong vibrations. This could get worse instead of better. Maybe it's time you switched instructors."

I said that would be putting Tim down unfairly. Margie said no, he had taught me well and everyone knew it.

"Well, maybe after I solo. He deserves the credit for that. When do you think I'll be ready?"

"I think you're ready now." She took my logbook and endorsed it. Then, she said, "Good luck," and got out of the airplane and walked over toward the operations shack.

It was so sudden. I sat there in the airplane for a while with my hand frozen on the throttle. Then, I pushed it in. Without the instructor's weight the airplane seemed light as a bird and I was airborne before I knew it. In a few minutes I was 1,000 feet in the air, all by myself. It was a marvelous feeling.

When I turned downwind and reduced power opposite the shack, I saw Tim come out on the porch and stand beside Margie, looking up, hands on his hips. All at once I felt guilty and worried, and a little frightened—until I noticed how small he looked at this distance, like a figure in a dollhouse. I felt like Gulliver, watching a Lilliputian. It was ridiculous. My hands relaxed on the controls.

"I'm going to land you, airplane," I said. "Matchwood or grease job, one way or another, I'm going to set you down, just me alone. So get ready."

The result was something in between, but good enough for Tim to stick a big thumb in the air and wave me on around. Then I knew everything was fine, and I stopped wondering and just flew, around and around. I never wanted to stop. I had actually made it. I was a pilot. ■

(Editor's Note: excerpted and cleaned up a little from the diary of a young woman learning to fly.)

FAMOUS **FLIGHTS**

ANGELS OF MERCY

The liberation of the aircraft cockpit from male domination began as early as 1909, when French Baroness de la Roche became the first woman to fly an airplane. Later, in the Twenties, extraordinary women like Amelia Earheart and Blanche Noyes pushed their way into the forefront of stunt flying and racing. But commercial aviation was another matter. Fledgling air carriers had enough trouble, in the early years of carrying passengers for hire, just filling up seats in their airplanes, let alone overcome the prevalent belief that flying was inherently a man's job, requiring the strength and courage of a lion.

On February 4, 1930, Ellen Church, a 21 year old nurse and student pilot, applied to the San Francisco District Manager of Boeing Air Transport (now United Airlines) for a job as a pilot. Ellen was a little ahead of her time. Almost half a century of flying was to pass before the first woman flew for a U.S. airline (Emily Howell, Frontier Airlines, 1973). But in 1930 the first barriers were broken down by a small band of determined women who took over the in-flight stewarding functions.

Flying had a romantic appeal in those early days, but the cabin environment was described by one passenger as a "chamber of horrors." Sound levels in Boeing's 80–A *Trimotors* were said to be as high as 117 decibels—about equivalent to sitting next door to a jackhammer. Conversation was impossible. Gas and oil fumes were plentiful. Oxygen depletion was evident at higher altitudes and frequent turbulence led to nausea and its inevitable consequences. Mail sacks were often piled high in the aisle, making an obstacle course out of the much traveled route to the rest room; desperately airsick passengers opened their window to relieve themselves. The wicker seats were chosen more for lightness than for comfort. The universal pacifier was the pocket whiskey flask, (most passengers were men) which produced oblivion for some but added distress for others.

Boeing's major route lay between San Francisco and Chicago, with an overnight stop at Cheyenne where flight crews were changed. The Chicago/Cheyenne run was the least difficult. With fairly level terrain most of the way the pilots could fly under the weather or detour around it. But the 950 mile stretch between Cheyenne and the west coast meant crossing both the Rockies and the Sierra Nevada mountains in unpressurized, unheated airplanes. With a service ceiling of 14,000 feet and without sophisticated navigational guidance, the pilots had to rely on visual reference and terrain familiarity to pick their way through mountain passes, where sudden up or down drafts terrorized unseasoned passengers.

Who could better distract passengers from these "occasional inconveniences" than a professionally trained "angel of mercy?" The airline hired Ellen Church, with instructions to recruit seven more nurses immediately—all young, competent and adventurous. This pioneer band of eight was outfitted with a flowing cape and beret, given a familiarization flight, and assigned one to an airplane.

The first flights, on May 15, 1930, were a sore trial to the starry-eyed young nurses. Pilot reaction was negative: including a woman in the flight crew seemed to demean their status somehow. They made it a point, at least in the beginning, to ignore the stewardess, or regard her as so much non-revenue baggage. One trick was to offload the stewardess at some dusty waypoint, on the grounds of being over gross, or to takeoff forgetfully while she was occupied in the terminal. Passenger reaction varied from curious and friendly to demanding and offensive.

BOEING AIR TRANSPORT INC.

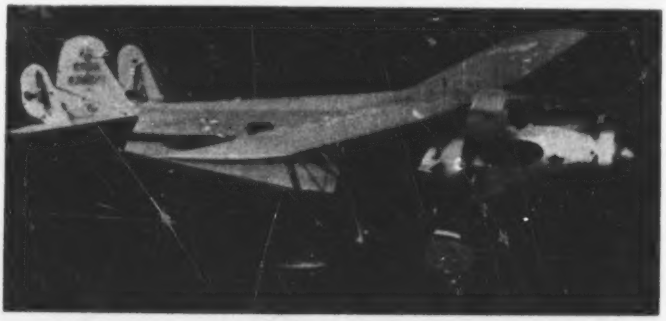
Before takeoff the young lady was expected to sweep out the airplane, empty ash trays and spittoons, set the cabin clock to local time, adjust the altimeter, make sure the seats were bolted down securely, and hang up the No Smoking sign. Lunch and other supplies had to be stowed on board, tickets taken and passengers greeted as they came on board. "Comfort packages" of chewing gum for air pressure, cotton for noise, and ampules of ammonia for air sickness were distributed.

En route the stewardess served an unvarying menu of cold chicken, sandwiches, fruit cocktail and coffee. By this time many passengers had lost all interest in food, although some appreciated the fruit cocktail which was laced with brandy. In turbulent conditions there was little the stewardess could do but try to smile and look unworried; her voice could not be heard above the engines, and the mail-strewn aisle was often too cluttered for her to reach a distressed traveller. She was expected to prevent unsteady passengers from using the exit door instead of the door leading to the rest room, or from leaning too far out of a window, or from playfully tossing baggage or mail sacks out. When the airplane was stranded en route by weather for hours or days on end, she helped find the passengers lodging and food, and contacted their sometimes frantic relatives.

At the same time, the stewardesses were strictly forbidden to socialize in any way with pilots or passengers. In time this edict was worn down, obviously, but in their first few years romance simply did not bloom in the airplane cabin. Nevertheless, Boeing was swamped with hysterical letters from their pilot's wives demanding that the stewardesses "menace" be ended.

In short, it was more of an ordeal than an adventure for that pioneering band of eight. Within a year and a half all of them had returned to the comparative serenity of nursing sick people on the ground. But their places were taken by other eager young recruits from many walks of life, and inevitably their presence on board brought about changes in the air service. Comfort and convenience, as well as decor and sophistication, made their way into the cabin, along with aircraft design improvements that produced larger, steadier and more reliable air carriers. The stewardess' role in making air travel more attractive was quickly recognized and their ranks expanded world wide.

Today, over a half century later, there are some 50,000 persons on duty in U.S. air carrier cabins, and about 95 percent of them are still women. An estimated 140 women are serving in the flight cockpit. Although that environment is still 99.6 percent male, the ladies definitely have their foot in the door, and as Ellen Church and her nurses demonstrated, big things come from small beginnings. ■



Tri-tailed Boeing 80 aircraft in flight over the Wyoming Rockies.

ASH-COATED Piper *Cherokees* temporarily grounded at Toledo-Winlock Municipal Airport, 30 miles north of Mt. St. Helens in Washington State. Military helicopters in background rescued 120 persons from the mountain's slopes following the first major eruption on May 18. Nightly overhauls, including oil and filter changes and cleaning out of all air intake systems, kept aircraft operational.

MILITARY TRAINING ROUTES

Beginning August 17, 1980 VFR navigational charts will show IFR and VFR military training routes where low-altitude, high-speed flight maneuvers may be taking place. Civilian aircraft are not prohibited from flying through these routes, but extreme vigilance is advised.

Pilots should check with the nearest flight service station to learn about periods of military training use, and possible relocation of military routes. Current route status is also given in the Aeronautical Chart Bulletin of FAA's Airport/Facility Directory, and shown on VFR Wall Planning Charts.

On sectionals, military training routes are shown in gray and designated as "VR" for VFR and "IR" for IFR.

WEATHER SERVICES AC REVISED

FAA has revised and reissued the Advisory Circular 00–45B, "Aviation Weather Services," used as a supplement to "Aviation Weather," the pilot's standard weather manual.

"Aviation Weather Services" describes the aviation weather service program in greater detail and further explains aviation weather forecasts and reports and how they are compiled and made available to pilots.

AC 00–45B is available for $4.50 from DOT Publications Section, M443.1, Washington, DC, 20590. (Stock number 050–007–00513–0)

VOLCANIC ASH FALLOUT HAZARD TO EXPOSED AIRCRAFT

An FAA Airworthiness Alert has been issued for aircraft affected by volcanic ash fallout from the eruption of Mt. St. Helens. All aircraft exposed to the ash, in the air or on the ground, should have undergone cleaning and inspection of all systems before being flown, because of the highly corrosive and abrasive nature of the ash. (See map for dispersal range.)

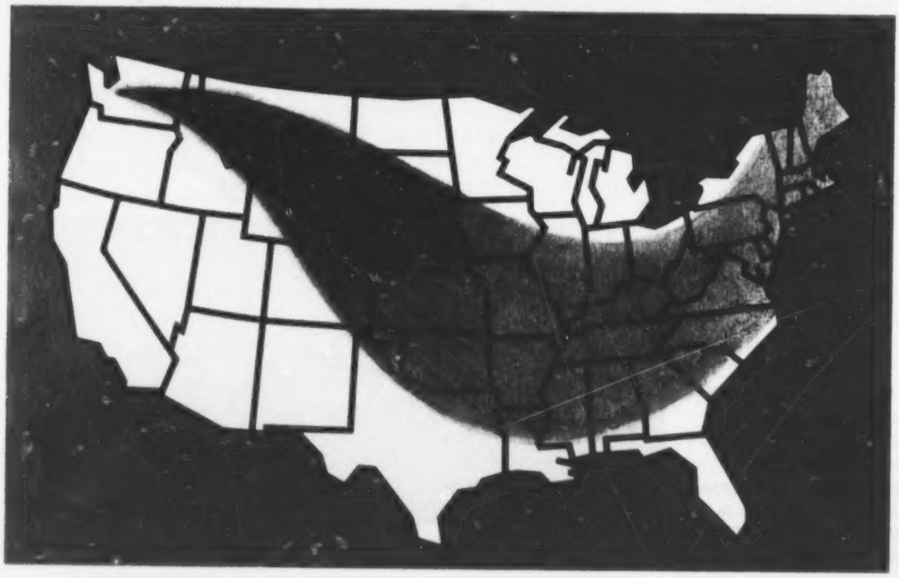
Analysis shows the ash contains such abrasive minerals as silica, feldspar, mangenese, boron, cobalt, and zinc as well as corrosive sulfuric acid and floride salts, which begin to damage surfaces almost immediately upon contact. The size of ash particles ranges from easily visible to almost microscopic, which engine air and oil filters cannot block out. Washing does not remove the microscopic residue.

The ash must be removed by hand brushing or preferably air pressure cleaning of all surfaces *before* washing with liquids. The aircraft should then be washed and rinsed with clean water until tests with nitrazine paper indicate no acid residue. Then solvents approved by the manufacturer may be used for more thorough washing as well as for purging pitot-static systems and cleaning vacuum lines and other external components, such as antennas. Electronic instruments that are air-cooled should be inspected for contamination and cleaned.

Engines could suffer abrasive damage from ash fallout adhering to turbine and compressor blades as well as cylinders and valves. Small particles of ash can become suspended in oil and carried throughout the engine. Engines should have a thorough external cleaning in the same manner as the airframe—having the ash brushed or blown away before washing. Oil and fuel should be drained and replaced after all filters and screens are changed and systems flushed and cleaned. Comparing spectrogaphic oil analysis taken shortly after cleaning to earlier analyses will show whether damage has occurred. Frequent subsequent oil changes and recurrent inspections are suggested to monitor engine condition.

Full inspection and maintenance procedures for ash-affected aircraft are given in the Airworthiness Alert, AC 43–16, entitled "Volcanic Ash Fallout." It is available free from the Flight Standards National Field Office, FAA Aeronautical Center, Oklahoma City, OK, 73125. Heavily affected aircraft should be inspected and cleaned by FAA qualified mechanics.

Airplane buyers might want to have a complete history of any airplane that could have been based in areas of heavy volcanic ash fallout. Suspiciously cheap bargains with low tach time could have been used "only by a little old lady who went sightseeing over Mt. St. Helens."



• Baron Boo-Boo?

Having recently purchased a Baron 58, your "One Engine Out" article (January/February 1980) momentarily caught me by surprise. My primary criteria for determining which twin to purchase was single-engine performance. In *Figure 2* in the article there is an error. The correct "percent loss" for a Baron 58 is 77.45, not the published 80.70. I cannot speak for Beech, but a correction would be appreciated.

Frank H. Bell
Jackson, MS

Beech built a Baron 58 and a Baron 58A. Both models had essentially the same components, but the earlier version had a higher maximum gross weight (5,400 lbs. compared with 4,990 lbs.). This could account for the difference in single-engine climb capabilities.

• Partial vs "Thin" Obscuration

In the article "Marginal Minimums," in the March/April 1980 issue of your fine publication, a reference to a weather report on p. 10 is a bit disconcerting. You report that the airfield in question was reporting "thin obscuration, visibility one and one-half miles." The term "thin obscuration" is incorrect. What was probably meant was "partial obscuration."

As a career weather forecaster, I find many general aviation pilots think the sky symbol "–X" means "thin obscuration." "–X" really means "partial obscuration," or that from 1 to 9 tenths of the sky is obscured by surface-based fog, haze, smoke, or blowing snow. I wonder how many have flown all the way down to the ground looking for the "thin?"

R.E. Merritt
Mobile, AL

In the accident referred to, "thin obscuration" was misstated in the official accident report from NTSB. The flight service station that issued the terminal forecast for the time of the accident, reported that it should have read, "Sky partially obscured."

The symbol "–X" meaning "partial obscuration," is used in hourly aviation weather reports, but a "–" before the ceiling terms ***scattered, broken,*** *or* ***overcast*** *does mean "thin."*

In aviation meteorology, "obscured" means that the sky or clouds are partially or totally hidden from an observer on the ground. "Thin" means that the cloud cover is mostly transparent and does not constitute a ceiling. Thus, "thin obscuration" would be a contradiction in terms.

• Underpinning the Underpining

I was pleased to read the letter in the March/April "Forum" and your editorial reply relating to the "clarity and simplicity of the English language" used in the magazine. However, I would like to point out a couple of misuses of the English language in an article—"Looking for Trouble in the Landing Gear"—in the same issue.

First of all, I looked in my 1972 edition of Webster's Seventh New Collegiate Dictionary and could not find either "underpining" or "safetied."

Actually, I'm only making a little fun of your proofreader. I like the word "safetied" when referring to nuts and bolts. I really enjoy your publication and look forward to each issue.

Donald M. Lammers
LaFayette, NY

Our 1969 Webster's Seventh New Collegiate Dictionary defines "safety" also as a verb meaning "to protect against failure, breakage, or accident." "Underpinings" does not appear, as they insist on spelling it with two "n's." We'll go along.

• Missed Approach

I have a comment about the answer in the March/April issue's "Instrument Corner" about Missed Approach Points. I agree that the MAP for non-precision approaches usually is the runway threshold, but not always. The MAP can also be some distance from that threshold, depending upon the location of the VOR, DME, or NDB used in the approach.

Harold O. Bourne
Jamaica, NY

True. If the NAVAID associated with the MAP is on the airport, the MAP may be located beyond the runway threshold. Also, the MAP may be affected by obstacles in the missed approach maneuvering area, i.e., the MAP may be located short of the threshold if missed approach obstacle clearance criteria dictates.

• Decision Height and Middle Marker

I would like to comment on Dr. Toker's question in the March/April 1980 "Instrument Corner." In your reply, you stated that the Missed Approach Point for an ILS approach is "in the vicinity of the middle marker." For any and all ILS procedures, the missed approach point is that point in space at which the glide slope intersects the decision height. Although the middle marker may be there also, it is coincidence. On most approaches, a pilot who crosses the middle marker before encountering the glide slope has gone below DH—a potentially dangerous situation unless the requirements of 91.116 have been satisfied.

R. L. Taylor
Columbus, OH

Your definition of the MAP is correct; however, it is not true that a pilot has necessarily gone below DH if he crosses the middle marker. When such ILS approaches are planned and the NAVAIDs constructed, the land directly below the missed approach point may not be purchasable or accessible. Flight standards criteria, however, require the MM to be located longitudinally within ± 500' of the DH. In such cases, approach plates will clearly show the marker located before or after the missed approach point.

• Air Marking Carried On

I read the interesting story about Mrs. Blanche Noyes in my January/February issue. Thank you for writing it.

Do you know if FAA has made any attempt to continue the air marking project she began?

Dan McKee
Raytown, MO

FAA no longer has an office of air marking since Mrs. Noyes' retirement in 1972. The Ninety-Nines, an organization of women pilots which Mrs. Noyes helped to establish, has taken over air marking activities with the help of state and local governments.

• Gone with the Breezy

Some years ago you answered a letter from someone who was inquiring about a "Breezy," and you gave the address of the Breezy Corporation. I wrote to that address recently asking for plans, information, photos, etc., but my letter was returned unopened. Are they out of business? Is there anyway I can get a set of plans or some photos from anyone, anywhere?

C. P. Michel
Bakersfield, CA

According to the Experimental Aircraft Association, there is no longer a Breezy Corporation, but plans and other information may be obtained by contacting Mr. Charles B. Roloff, P.O. Box 358, Palos Park, Il., 60464, telephone 312-598-6210.

• Elixers Aloft

In January 1980, Richard A. Sutter, M.D. received his private pilot's certificate at the age of 70, while continuing to practice medicine in St. Louis. No record, true, but this youthful attitude keeps him young below his years. Dr. and Mrs. Sutter beat my husband and me at tennis with regularity despite the fact they are my parents' age. In fact, they are my parents!

Judy Hinrichs
St. Louis, MO

Who says you can't teach an old doc new tricks?

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Bewildered in the Blind

In the March/April 1980 issue, the article "Position Reports" advocates transmitting in the blind on the air-to-air frequency of 122.9 when there is no UNICOM or when the UNICOM is not operating. It is my understanding (from the Airman's Information Manual) that when UNICOM is not operating pilots should continue to use the frequency designated for that airport. Could you clear this up?

Name Withheld

Sorry, we goofed this one. AIM states that ". . . if unable to contact the UNICOM operator, use appropriate UNICOM frequency to broadcast positions or intentions in the blind. Should have read, for airports with no tower, FSS, or UNICOM broadcast positions or intentions in the blind on 122.9." And thank you.

• Clear Vision

I'm at the age where a glaucoma test is recommended as a part of the regular eye examination. I understand that some sort of desensitizing drops are put in the eye before the test, and I was wondering how long after the drops wore off before I could fly again.

L. Cooke
Winchester, VA

If drops are used to "numb" the eyes for the glaucoma test, the effect should wear off within a few hours at most. Assuming an open cockpit is not being used, no flying restriction is necessary. Some practitioners now use a glaucoma screening device that does not touch the eye, and no drops are necessary.

• Ignoring Visibility?

Your article "Marginal Minimums" (March/April 1980) leaves the casual reader with the impression that the only requirements for landing from an instrument approach are having the runway environment "clearly and continuously" in sight and the aircraft being in a position to land normally. You virtually ignore minimum visibility distance. Why?

James M. Thoburn
Rochester, NY

Stressing the requirements of FAR Part 91.117 should not lead to ignoring the visibility minimums defined in Part 91.116. A proposed change to FAR Park 91 (see "News" p. 14, May/June 1980) seeks to clarify the issue. The rule change will embody the requirements in a single rule.

INSTRUMENT CORNER

• Mandatory Descent to MEA?

Paragraph 370(b) of the Airman's Information Manual states that when an approach clearance has been received and when the aircraft is established on a published route, published altitudes apply to descent unless a different altitude is assigned. Does this mean it is *mandatory* to descend to the MEA on an airway immediately if cleared for the approach while some distance from the facility, provided no altitude restriction was issued?

Thomas E. Miller
Ballston Spa, NY

If no descent instruction is included in the clearance, descent may be commenced at the pilot's discretion provided the aircraft is on a published route or segment of an instrument approach procedure. *If in doubt advise Approach Control of your intentions.*

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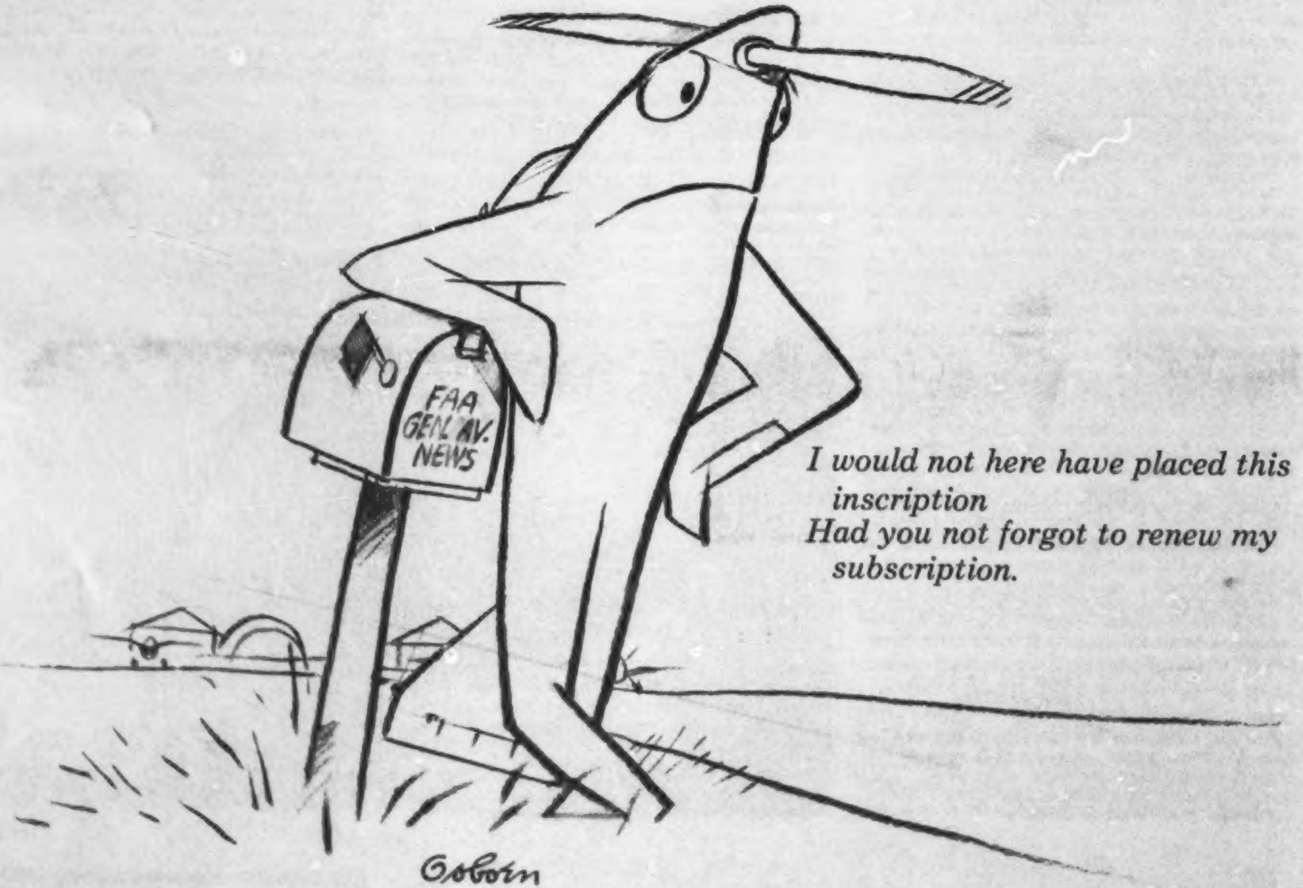

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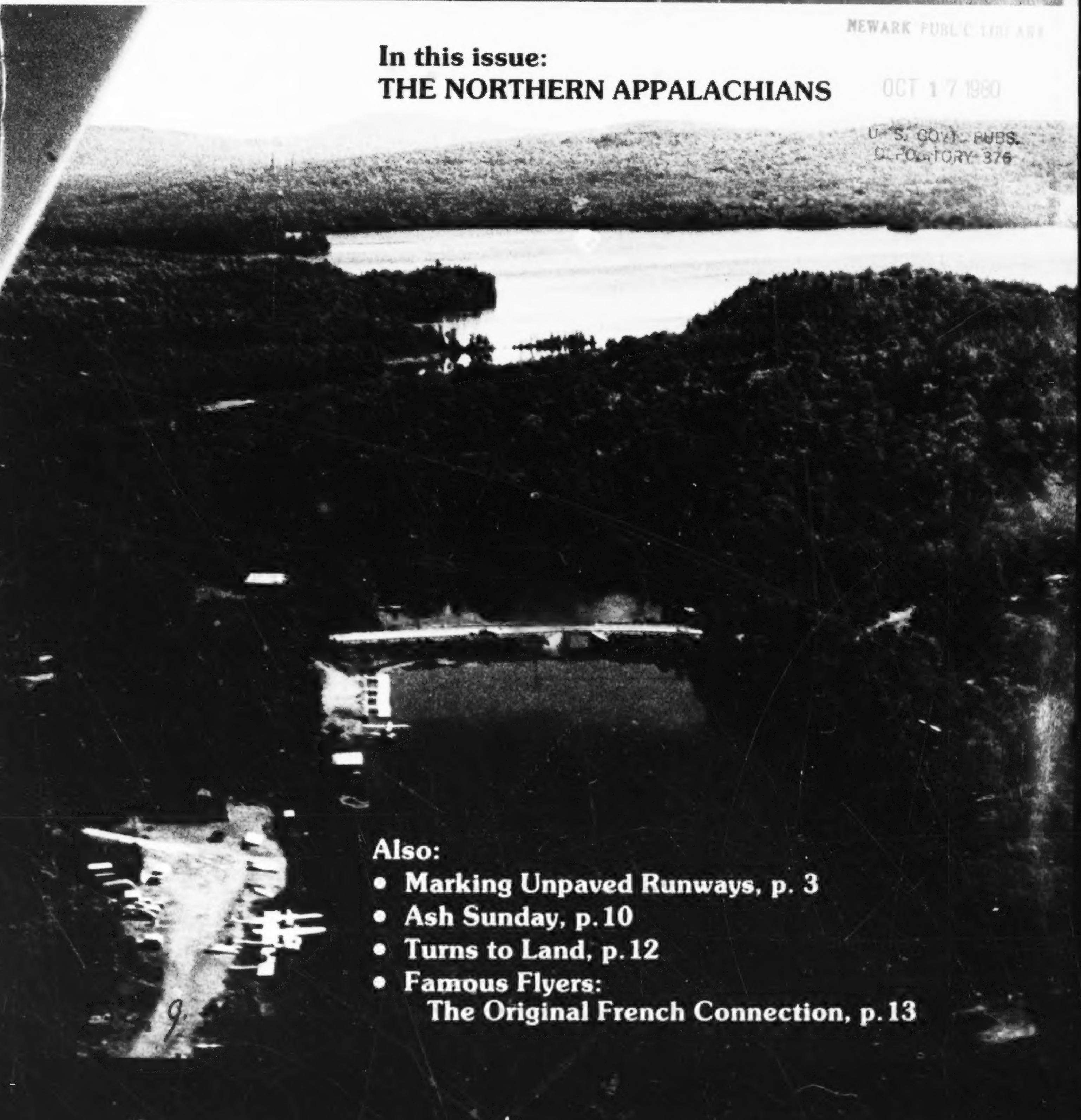

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  The Original French Connection, p. 13

9.

FAA GENERAL AVIATION NEWS

**DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION**

SEPTEMBER-OCTOBER 1980
Volume 13, Number 5

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BRIEFS

HANDLES WITH CARE. After examining inadvertent gear retraction accidents between 1975 and 1978, the National Transportation Safety Board has concluded that, typically, these accidents occur when the pilot reaches for the *flap* UP switch and activates the *gear* UP switch instead. In some light general aviation aircraft manufactured by Beech, the two can be easily confused because of cockpit design, especially when the pilot's attention is distracted. The Board recommended that Beech modify the switches to prevent confusion. Until such time, take care when handling handles.

NEAR MISSES—UNCONTROLLED AIRPORTS. As reported in the March/April 1980 issue ("News" p. 14), the FCC has begun reassigning UNICOM frequencies for uncontrolled airports in 15 areas of the country where overlapping has been a problem. However, several airports have put their new frequencies into effect before the change has been indicated in the latest Sectional Chart. Two near-midairs occurred on the same day at the same airport near Seattle. Pilots were unaware the frequency had been changed. In each of the two incidents, a pilot was on the newly assigned UNICOM frequency and the other was relying on the frequency given by his chart. Use the frequency on the current chart (updated every six months). To be doubly safe, check the associated FSS for NOTAMs, or the Airport Facility Directory.

PETROL PURLOINERS. Higher fuel prices and scarcity of fuel in some areas have made victims of the light aircraft owner in more ways than one. The Aircraft Owners and Pilots Association reports fuel thefts from light aircraft are up again all over the country. Pilots are warned to check fuel levels in the tanks *visually* before taking off in an owned or rented plane—even if you topped the tanks before parking. Fuel thefts have not caused any accidents—yet.

HOT WINGS. Vent lines, which are supposed to expel fuel and vapors from the pressure relief valves, have caused explosions and fires in the wing tanks of some light twins when inadvertently disconnected. So far accidents of this type have occurred only on the ground. The aircraft had recently undergone wing tank maintenance. The disconnected lines allowed fuel vapors to become trapped in the wing and flow inboard toward the nacelle, where ignition occurred. The problem has been traced to improper replacement of fittings after inspection or maintenance. Following manufacturer maintenance instructions should eliminate the problem.

WATCH YOUR STEP. A *Queen Air* recently was forced to make an emergency landing after voltage regulators for its NICAD batteries failed, causing the batteries to overcharge and vent gas into the cockpit. The regulators had failed because the *Queen Air's* floor-mounted circuit breakers had been damaged by the heavy feet of pilots and passengers. A 1967 Beech Service Bulletin requires relocation of floor circuit breakers in all models of the Beech 65–80.

MARKING UNPAVED RUNWAYS

An Inexpensive System That Could Save Lives

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Light and mark an unpaved runway for less than $3500?

Not likely, you say? Everyone knows it can cost in the hundreds of thousands of dollars to install runway, approach, and taxi lights, etc. for a paved runway—not to mention literally miles of expensive electrical cable and the accompanying electrical bills.

Why bother to spend all that money on a grass or dirt strip that doesn't have much traffic anyway?

Answer? To save lives and property. Any pilot who has experienced an emergency over unfamiliar terrain and searched in vain for a small, unpaved airport shown on his chart will underline that reply. Nothing is as elusive as a few hundred feet of turf runway when you are low on fuel and altitude. At night the difficulties are multiplied. Many a meadow or cow pasture has been mistakenly used for an emergency landing, sometimes with unhappy results, simply for lack of positive identification. Even familiarity with the field is no guarantee that you can locate it when changes occur in the environment.

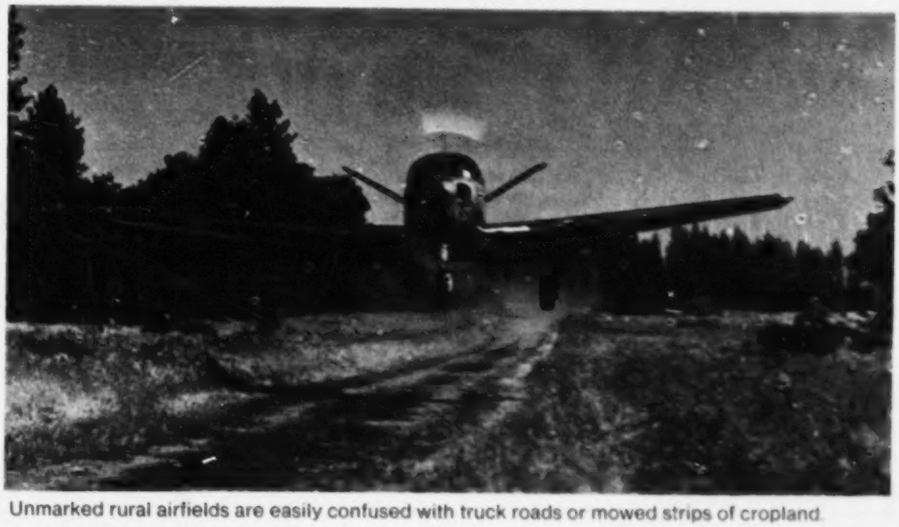
For example, the pilot of a *Starduster* recently had an unpleasant surprise as he was returning from a fly-in barbecue near Delphos, Ohio even though he had taken off from the very same neatly trimmed grass strip that same day. However, during his absence the grass on the surrounding fields had been mowed—to approximately the same height as the runway, as it happened. In the fading light of the late afternoon the pilot landed on newly shorn but somewhat boggy turf, well short of the touchdown zone, skidded into an unpainted edge marker, and nosed over. Considerable damage to a cherished airplane.

If you have ever had trouble locating an unpaved strip in the daytime, try landing at an unlighted, or feebly lighted, field in the dark. Inadequate lighting can create shadows that distort one's perspective—as an Illinois pilot found out recently just when he felt he had everything in hand.

He was returning his Cessna 210, *Centurion*, to its home base in Annawan, Ill., after some engine work at Davenport, Iowa. His destination was an unpaved strip of pea gravel over sod some 30 miles from Davenport. The east-west oriented runway is in a largely rural, unlighted area. A house and a hangar abut the runway's east end, and the west end is surrounded by a field plowed to within three feet of the runway. A water runoff ditch on either side of the strip and perpendicular to it is approximately 300 feet from the 09 approach end.

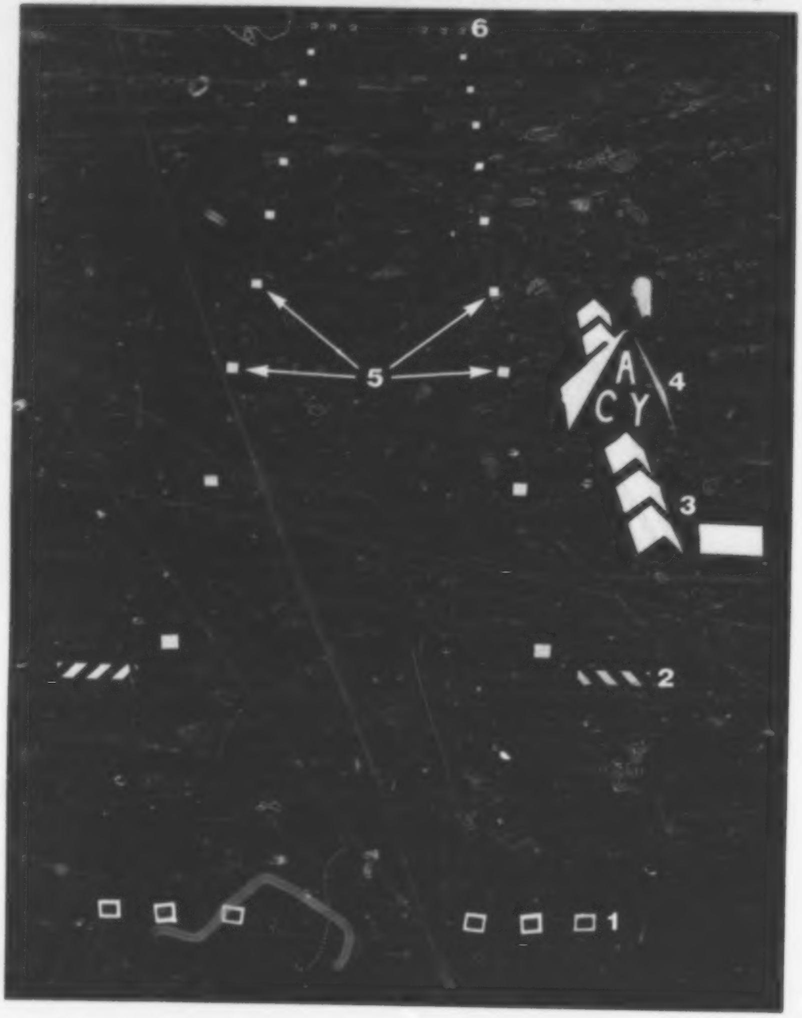
The 25-year old pilot had 350 hours of experience, with 36 in the *Centurion*, but he had only one hour of total time in the preceding 90 days. Nevertheless, he departed Davenport with two passengers about 9:15 p.m., climbed to 7500 feet to overfly the Moline TRSA, and headed for the airport. There were no lights on the field, but he spotted a familiar configuration of house and hangar lights at the far end of the runway. A full moon rising at his back gave him fair visibility in the clear night.

After two low passes to orient himself, the pilot approached runway 09 from the northwest



Unmarked rural airfields are easily confused with truck roads or mowed strips of cropland.

Unpaved Runway Marking Components (Illustration)



1. Threshold markers
2. Aiming point marker
3. Alignment markers
4. Pyramid and windsock
5. Runway edge markers
6. End markers

and lined up his heading indicator and the house lights to put him over the centerline extention, using the hangar light as an indication of the left edgeline of the runway. He made the approach power-on, with full flaps, and at 75 kts. Everything seemed fine until touchdown, which took place in the plowed field well to the left of the runway. The pilot tried to steer the airplane across the furrows toward the runway with some success—until the nose gear struck the runoff ditch and broke off. The *Centurion* stood on its nose and collapsed inverted on the runway.

"Well, we made it," the pilot told his shaken but essentially unharmed passengers.

Still, why all the fuss for a few agricultural strips and private airports? Paved runways are the rule nowadays.

Are they? Of the 13,000 airports available for fixed-wing aircraft in the United States, *only about 5,000 are paved.* The remaining 8,000 unpaved airports are used by the majority of general aviation pilots.

In 1978, there were 235 accidents at these 8,000 unpaved airports. All but a handful occurred on landing. Most of the landing accidents were caused by the pilot's failure to recognize the airport or determine runway boundaries, resulting in a poorly executed approach that led to an overshoot, undershoot, landing on a closed runway or other unsuitable ground, running into ditches, cattle, etc.

Few of these accidents were fatal—only four, with five fatalities. All together 195 planes were substantially damaged and 31 destroyed—as well as various unlucky objects on the ground: planes, cars, tractors, hangars, stock and game.

Most of these small airports are not supported by federal funds and hence are not FAA regulated. Safety standards, set by state and local governments, must take into account the limited resources of the operators, who generally derive little or no revenue from transitory aircraft usage. Everyone is in favor of 'small airports, but economic factors limit what the operator can do in the interest of safety.

This is the dilemma which has led to a search for a safe and inexpensive way to mark the unpaved fields. State aeronautical officials in New Jersey approached the airports branch at FAA's Technical Center (formerly NAFEC) in 1977 with the project. If a reasonable marking system could be designed, which conformed to *national* minimum safety requirements, then airports from state to state would have standardized markings quickly recognized by the pilot wherever he flew.

The marking system that emerged from the research and experimentation consists of everyday materials sold in neighborhood hardware stores. It can be built from plans that any weekend carpenter can follow.

The core of the system is the identification marker. What was needed was a structure that could be seen a maximum distance without the aid of electricity. After testing different arrangements of designs and colors, the engineers found that a simple black and white pyramid, on a square base 16 feet on a side was the most effective overall. It is visible up to a distance of three miles—i.e., visibility requirements for a VFR day.

Since the pyramid shape is not used in any other aviation marking, its designation as the locator for an unpaved strip could become universal. For ready identification, the pyramid is located next to the runway, with its base parallel to the landing direction.

With the pyramid assuring the pilot that he has indeed located an airport, and not Farmer Jones' beanfield, the next question is *which* airport is it. All airports have an official three- or four-letter/number designator, which can be found in the Airport/Facility Directory when the pilot is doing his preflight planning (the Directory will also give vital statistics about the airport, including fuel availability, UNICOM, etc.). In this new marking system the designator is painted on the sloping sides of the pyramid marker. Numbers or letters approximately six inches thick and about three by four feet in size have been found to be readable at altitudes of 2,500 feet or even higher. Again, black and white proved to be the most readable color combination for all conditions.

After locating and identifying the airport, the visiting pilot's next concern is which way to land—or, *where is the windsock?* There is no standard site for the wind indicator, and at many unpaved airports it can be difficult to pick out from a background of trees or bushes. The new system positions the windsock right on top of the pyramid, so that there is no need to look further. Runway alignment is indicated by a series of six small tent-shaped markers, three forward and three aft of the pyramid. A fourth marker is placed at right angles, to show right hand pattern traffic, in the same manner as the L-shaped figures on a segmented circle. A black X on one of these markers designates a closed runway. Painting half of one marker red denotes a displaced threshold.

Runway edge marking, always a problem at night for unlighted airports, presents even more of a problem at unpaved airports; at night the pilots of aircraft attempting to land may have trouble picking out the touchdown zone or the lateral limits of the runway. The new turf marking system solves this problem at minimal expense by using retro-reflective material instead of electricity and wiring. Retro-reflection is a means of causing light beams to be reflected back directly at the sender. Light from the airplane's landing lights is picked up and reflected back by special plastic cells placed on non-electrified markers along the runway edge. Retroreflection is much more effective than ordinary reflective devices, which allow the light to bounce off in various directions. The pilot can see the runway quite well from a mile out. Retro-reflection is coming into wide use on the nation's highways. In daytime, the runway edges are indicated by black and white panels which house the retro-reflectors.

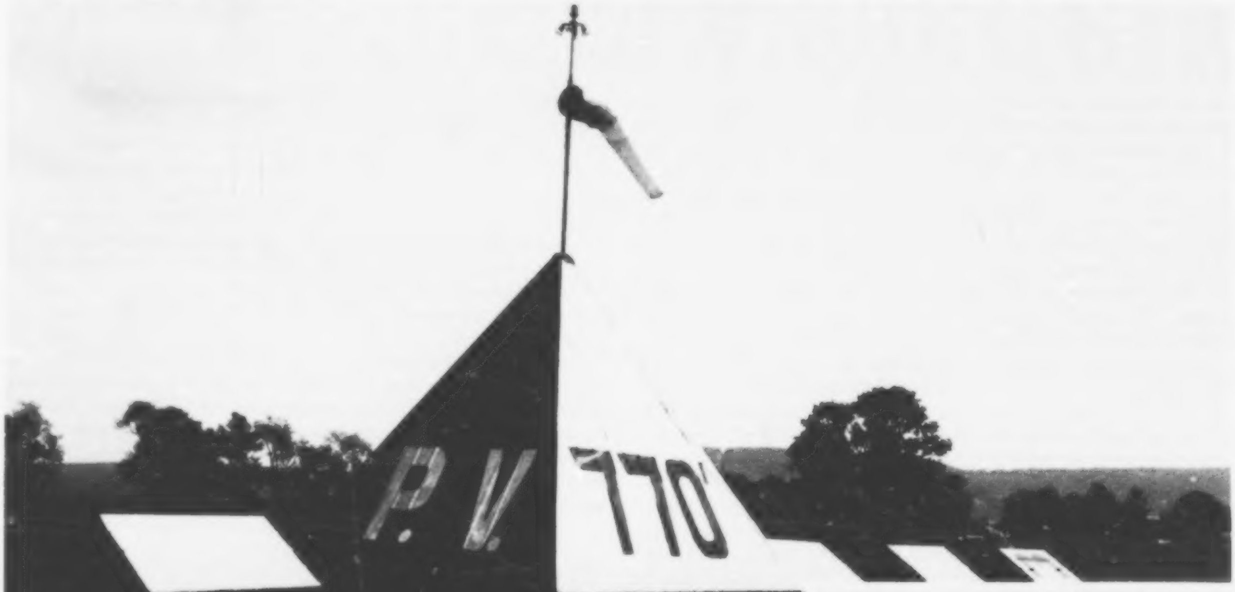
Electric lighting in the new system is used only at night to floodlight the pyramid, to illuminate the approach and departure ends, and for the simplified VASI. Three green lights at either side identify the threshold, and three red lights are shown on each side of the departure end of the runway. The aiming point for landing, or "intercept," is designated by four white lights outside the runway on either side. Two elevated amber lights, in combination with the aiming point lights, make up a simplified VASI for night use. (When the amber and white lights are aligned horizontally, the pilot is at the proper angle for his final approach.)

For daytime use, an even simpler VASI consists of two plywood panels painted fluorescent orange and positioned in front of a third panel, which represents the aiming point. Again, horizontal aligning of all three panels indicates the correct approach angle.

Another problem peculiar to turf runways is the difficulty in judging when an approach to land should be aborted. Estimating distances with the unaided eye is very hard in the dark, or even in the daytime when the turf of the runway blends into the surrounding terrain. The presence of red lights at the end of the runway helps, but even more helpful is a distinctive marker. The new system uses a black and yellow side marker positioned one-third of the distance down the runway. If the wheels have not touched down by this point the go-around should be started immediately. The new system also uses markers (a yellow arrow on a black panel) to show the exit to the taxiway.

Field testing of this turf marking system is now going on at Twin Pine and Alloway Airports in New Jersey, and at Pleasant Valley Airport in Brodheadsville, Pa. Pilots are invited to try out the facilities and comment. Plans and a list of materials needed for installing this version of turf runway markers are available free from FAA's Technical Center, ACT–410, Atlantic City Airport, NJ 08405. Original estimate of the cost for a 2,400-foot runway airport was about $2,500, of which half went to lighting (1978). Inflation will have pushed that figure higher, but Victor Dosch, who helped to design the system for FAA, believes it could still be installed for under $3,500.

A pretty low figure for making a turf runway a whole lot safer than a shot in the dark. ■



"It takes the fear out of landing at unpaved airports," according to John Elnitski, owner of Pleasant Valley Airport at Brodheadsville, Pa. Elnitski, with help from his wife and teenaged sons, built the Technical Center's unpaved runway marking system in three months last year for his 2600-foot grass strip in the Poconos. "Student pilots, airline pilots, everybody thinks it's the greatest thing in the world. I just wish more people knew about it." Airport operators and pilots from as far away as Georgia have landed at Pleasant Valley, some of them dropping in out of curiosity after flying over and seeing the markers.

Elnitski lent a few personal touches to the design. He used galvanized metal and aluminum sheeting rather than plywood for durability. He painted the airport elevation (770 feet) on the pyramid and the runway numbers (18-36) on alignment markers on either side of the pyramid. The markers help dramatically to differentiate Pleasant Valley's runway—a former farm field itself—from literally dozens of other neat fields in the area that could be mistaken for turf runways.

Photos by Diane Sewell

Gentle slopes of the Northern Appalachians are deceptive

HARD ROCK AND HIGH WIND

Where the Appalachian Mountains reach up into New England they are divided by the Connecticut River into two distinct ranges: the Green Mountains of Vermont and the White Mountains of New Hampshire. Since 1958 the extension of the White Mountains into Maine has been called the Longfellow Mountains. Vermont's Green Mountains form the most continuous north/south ridgeline, running almost 200 miles from Massachusetts to Quebec Province, but the highest point (Mt. Mansfield) is only 4,393 feet. The higher peaks of the White Mountains are bunched in the center of New Hampshire, dominated by Mt. Washington (6,288 feet). In Maine the higher elevations are in the north, with Mt. Katahdin (5,267 feet) marking the terminus of the Appalachian trail.

Since these mountains, unlike Mt. St. Helens in Washington State, are non-volcanic origin, no soaring cones or dramatic escarpments are in evidence. The Appalachians developed due to internal pressure as a series of folds or ripples in the crust of the earth. Millenia of erosion, plus the work of numerous glaciers have etched out a gallery of gently curved peaks, small basins and valley passes, or "notches." The area can be easily transited in light aircraft in good weather. Mountain flying accidents are not common, but the majority of those that do occur are ascribed to pilot error—and considered preventable. In many cases it is difficult for the accident investigator to pinpoint the cause. Usually the accident takes place in a normally functioning aircraft, with no particular urgency or pressures affecting pilot performance.

Some local observors believe that the absence of severe terrain features lulls unwary pilots into relaxing their vigilance when flying over these apparently gentle New England slopes, leading to a situation where they are unable to cope with changing weather, rising terrain or downdrafts. One common type of mountain terrain accident in New England involves aerial sightseeing. In many instances the pilot became engrossed in watching for moose or beaver and failed to realize the rate at which the airplane was descending, or the terrain was rising.

Misjudging distance above the ground often occurs in these mountains because of the pilot's unfamiliarity with the size of the trees. The mixed hard woods, spruce and fir of northwestern Maine's timberlands, for example, are often considerably smaller than the stands of trees in the southern Appalachians, or in the western mountains; a pilot who fails to take this fact into consideration might easily *over-estimate* his terrain clearance. Additionally, pilots from more southerly areas are often surprised by the relatively low elevation at which the tree line occurs in New England. Estimating distances from barren ground is difficult.

A typical accident occurred in August during a charter flight near Mt. Katahdin. This highest of Maine's peaks is located in Baxter State Park, a 200,000 acre Wilderness Area in northern Maine. A party of four bear hunters had been flown into a camp a few miles west of Baxter Park at the beginning of the week and were scheduled to be brought out on Saturday to Moosehead Lake by a pilot working for a local flying service. The same operator had flown the four men to their camp in two separate trips in a float-equipped Cessna 180. On each trip the aircraft had been at near maximum gross weight, as the hunters had brought in a dozen cases of beer in addition to six rifles, considerable ammunition and fairly extensive camping gear.

When the pilot landed on a small pond near their camp on Saturday for the return trips, he was requested to take all four men out together, as they wished to look over the game preserve in the Park from the air on their way back. They wanted to have their equipment brought out subsequently and they had taken no game. The pilot explained that the airplane was not approved for five adults and limited as regards to total weight. The hunters insisted, arguing that they averaged well under 170 lbs. per man. The pilot attempted to contact his operator but was un-

Shin Pond, Me. Shallow wooded slopes are known for turbulence.

successful. He was finally prevailed upon to take all four, with the understanding that he would maintain a minimum safe altitude at all times.

The wind on the pond was nearly calm, so he was able to use ample takeoff distance over the water, and climbout was normal. He flew over Baxter Park in the vicinity of North Brother Mountain and continued on a southeasterly course, headed for the Great Basin where a number of moose and bear sightings had been reported recently. For some reason (which he could not explain) he entered the airspace over North Basin instead, where an adult bear was spotted by one of his passengers. He made several shallow S-turns over the area to accommodate his passengers' desire to scan the heavily wooded area. Then he noticed that he was losing altitude and opened the throttle. There was no increase in manifold pressure (22 inches at 2,300 rpm).

Although he now lowered the nose and applied full power his airspeed decayed to 75 mph and he was unable to maintain his altitude over the ground, which appeared to be "almost level, or maybe a slight rise." He could see no alternative to impacting the trees and decided to land straight ahead with the aircraft under control. He cautioned his passengers to prepare for the impact (one did not have a seatbelt on), then dived the airplane briefly in order to pick up enough airspeed to flare above the tree tops.

Impact was severe and the 180 flipped over and came to rest in an inverted position. The smell of leaking fuel was very apparent to the pilot, who kicked out his window and called to his passengers to follow him out of the airplane. He was just able to get all of them to the ground and away from the plane before it caught fire. The blaze was seen by a fire patrol aircraft, and the five survivors were rescued by helicopter two hours later. No one was badly injured.

In his statement to investigators after the accident, the pilot stated that he believed engine malfunction to be the cause of the accident. However, the engine had given no evidence of malfunction. In any event, it would have been unusual for this type of engine, even in a new condition, to achieve more than 22 inches of manifold pressure at the elevation of impact, which was 2,700 feet. The terrain in this area, in the direction of aircraft travel, rises at an average rate of 700 feet per mile, but the angle of rise is not readily apparent from the air. The investigator's report also suggested that with five persons on board the 180 would have been close to or above maximum gross weight—it was not possible to determine this precisely because of a discrepancy in the statements regarding fuel on board.

The five occupants were extremely fortunate to have survived the fire and to have been rescued so quickly. Northwestern Maine and the adjoining province of Quebec is a very sparsely settled area with millions of acres of dense timberland. The section of Maine that lies north and west of Millinocket, about 6,700 sq. miles, has no public airports for land planes. There are in fact very few roads or other open areas between the trees where an aircraft could be put down safely in an emergency. Essentially the only treeless areas are above-timberline balds, liberally strewn with granite, or bogs, which may look solid enough from the air to land on but are treacherously soggy. Most of the local flying in this area is done with floatplanes.

The hundreds of ponds and lakes of northern Maine make it very inviting country for the floatplane pilot, but he has to remember that each body of water has its own characteristics for flight operations, and that an accident on an isolated pond could have very serious consequences. The wind does not always accommodate the pilot by blowing down the length of the lake, and even small hills or bluffs nearby can produce serious downdrafts when wind velocity is greater than 10 to 15 knots.

In May of 1979 a pilot took off from Shin Pond, about 30 miles northeast of Mt. Katahdin, at 1:00 p.m. in an *Aeronca*, accompanied by his son. The pilot's logbook showed 416 hours of total time, with 351 in the *Aeronca*. Shin Pond extends for about two miles in a north/south direction; the seaplane base is located in a northwesterly bay. The visibility was clear, with a strong westerly wind averaging 50 knots and gusting to 60.

The aircraft was observed taxiing out of the bay and taking off to the south with a strong westerly crosswind. After liftoff the *Aeronca* was turned into the wind. The course brought the pilot close to a heavily wooded ridge in the west shore of the lake. At this point, according to his statement, he encountered "severe turbulence and downdrafts." He turned right 180 degrees and flew downwind across the width of the narrow pond in order to escape the turbulence. However, he continued to lose altitude and was unable to clear a stand of trees on the east shore of the pond and crashed into the woods. The pilot was injured seriously, and his son received minor injuries. The aircraft was heavily damaged, but fortunately did not burn.

According to one witness, an experienced bush pilot, the injuries might have been avoided if the *Aeronca* had been held into the wind, so that impact would have been made at virtually zero groundspeed. The *Aeronca* pilot's subsequent conclusion was simply that he "should have stayed on the ground."

Hopefully it was a lesson well learned. Wind velocity has to be considered a key factor in planning a takeoff from a pond even in these small mountains, where strong downdrafts can pin you down like a giant hand.

Local turbulence is a common characteristic of the northern Appalachians, despite their modest size and gentle appearance. Mt. Washington, in the White Mountains of New Hampshire, at 6,288 feet has recorded the highest wind velocity on earth, an incredible 231 mph (May 14,

Landing fields are few and far apart in the big woods of northern Maine

New England ridges like these produce vicious up and down drafts when the wind velocity is high.

Sightseeing plane (center) near steep bluffs may be in for an unexpected elevator ride—down.

Shallow crest of Mt. Washington site of highest recorded wind velocities in the world.

1934). Scientists have difficulty explaining this phenomenon. The half dozen mile-high mountains in the Presidential Range of the White Mountains do not appear to present a formidable or significant wind barrier, yet 100 mph winds are not uncommon. On any given day the winds can be quite calm in the morning and quite savage by midafternoon. Even veteran local pilots are occasionally lulled by the benign appearance of these mountains, on a serene summer day, into flying without first checking the weather forecast.

A good example involved a sightseeing flight from White Mountain Airport at North Conway, N.H. The commercial pilot had nearly 13,000 hours of logged time, with 890 hours in the WACO UPF–7 he was flying on this occasion. He had made dozens of sightseeing flights in the White Mountains and was known as an extremely competent pilot. However, for some reason on this busy day, with the mountain range in full summer bloom and the visibility unlimited, he neglected to get a weather forecast. (Official Weather Service reports indicated winds aloft of 45 knots in the vicinity of North Conway, gusting to 65 knots.)

The biplane took off at 3:15 p.m., with two passengers up front and the pilot flying from the rear seat. He proceeded to the northwest, approaching Black Cap Mountain at an altitude of 2,700 feet after clearing the ridge line by approximately 300 feet. While executing a southerly left turn the WACO experienced a rapid rate of descent on the leeward side of the mountain. Although he reported that the engine was operating normally, even with full power he was unable to check the altitude loss and struck the side of the mountain at a level of 2,000 feet. The airplane pancaked into a stand of spruce trees before impacting a hard rocky ledge. All occupants escaped with minor injuries, and the airplane, although substantially damaged, did not burn, The pilot acknowledged that the accident would have been prevented if he had adhered to his own rule of avoiding flying over ridges when the wind velocity was over 40 knots.

In contrast to Maine and New Hampshire, Vermont is straddled by a fairly continuous ridge of the northern Appalachians which extends from Massachusetts to the Canadian border. These mountains are not high, never reaching up beyond Mt. Mansfield's 4,393 feet at Stowe, but they do form a significant impediment to the movement of air—and sometimes are a problem for airmen. The state is bordered by the Connecticut River valley to the east, and the Hudson River valley and Lake Champlain to the west. Skies may be clear over the valleys but clouded or heavy with precipitation over the ridges. The most common type of mountain flying accident in Vermont appears to result from attempts to fly over the ridges VFR in instrument weather. Such accidents are not frequent, but very often they are fatal, as was the following crash near Jay Peak in northern Vermont.

The pilot was a flight instructor with 2,800 total hours but no instrument rating. He took off from Fulton in upstate New York in his Cessna 180 on a November afternoon with two passengers bound for Willimantic on the Maine coast north of Augusta. According to the National Transportation Safety Board, the Utica (N.Y.) flight service station was contacted by the pilot at noon for a weather briefing and for advice on the best possible route. The FSS specialist indicated that all routes were in IFR conditions with low ceilings, rain and fog expected to persist. He gave a weather synopsis, as well as the forecast winds aloft. The pilot did not file a flight plan or disclose whether he intended to carry out the flight.

At 12:32 p.m. Syracuse Approach Control was contacted briefly by the 180 pilot, who reported having just taken off from Oswego County Airport. His transponder was squawking 1200 (VFR flight). Shortly afterwards a controller at Burlington (Vt.) Approach Control noticed an unidentified target on his radar scope tracking across Lake Champlain with the transponder in the VFR code—a disturbing behavior in view of the instrument weather prevailing over the area. He observed the aircraft head northeast to Franklin County Airport near the Canadian border and then turn east, proceeding in a straight line until it disappeared about one mile north of Jay Peak Mountain. At this hour the weather at Newport, Vt., about 15 miles east of Jay, was reported to have a ceiling of 1,000 feet overcast, with fog and rain, visibility two miles. The elevation at the summit of Jay Peak is 3,861 feet.

A hunter staying at a camp near Jay later reported having heard an aircraft circle the camp at a low altitude. He stated: "The clouds had just settled down low on the mountains, and I could not see the plane. It headed across from camp, maybe half a mile . . . the weather in this mountain range changes very rapidly. It had been a fairly clear day down low, but the clouds settled in fast this certain afternoon."

Another witness, a truck driver from Jay, was standing in front of his house at this time when he heard an aircraft go by overhead, traveling northeast. After a while he heard the plane coming back overhead, headed in the opposite direction. There was a heavy fog, and he could not make out the airplane visually.

Six days later the aircraft was spotted lying at the 3,300 foot level near Jay Peak Mountain. A paramedic team was brought to the area by helicopter from Plattsburg Air Force Base. There were no survivors.

Similarly tragic was a flight across Vermont in the opposite direction, when a non-instrument rated pilot attempted to fly himself and his wife from Wicasset, Me., to Michigan via central Vermont. The pilot was flying a Piper PA-24, in company with a friend in a Cessna 175, who *was* instrument rated and had filed IFR. Both aircraft took off at approximately 9:30 a.m., under locally VFR conditions, and were able to maintain visual contact with each other for the first 20 minutes of flight as they flew toward Lebanon, N.H., on the Vermont border. The 175 pilot reported subsequently that as he approached Lebanon he was given an altitude change by air traffic control from 6,000 to 8,000 feet, which put him into solid IFR conditions. He estimated the base of the cloud layer over the mountains as approximately 6,500 feet. He stated:

"I was almost solid for the next 40 minutes or so, getting only an occasional glimpse of the ground. I was in constant communication with N5039P (the PA-24), talking to him six to eight times. I told him we were solid at 8,000.

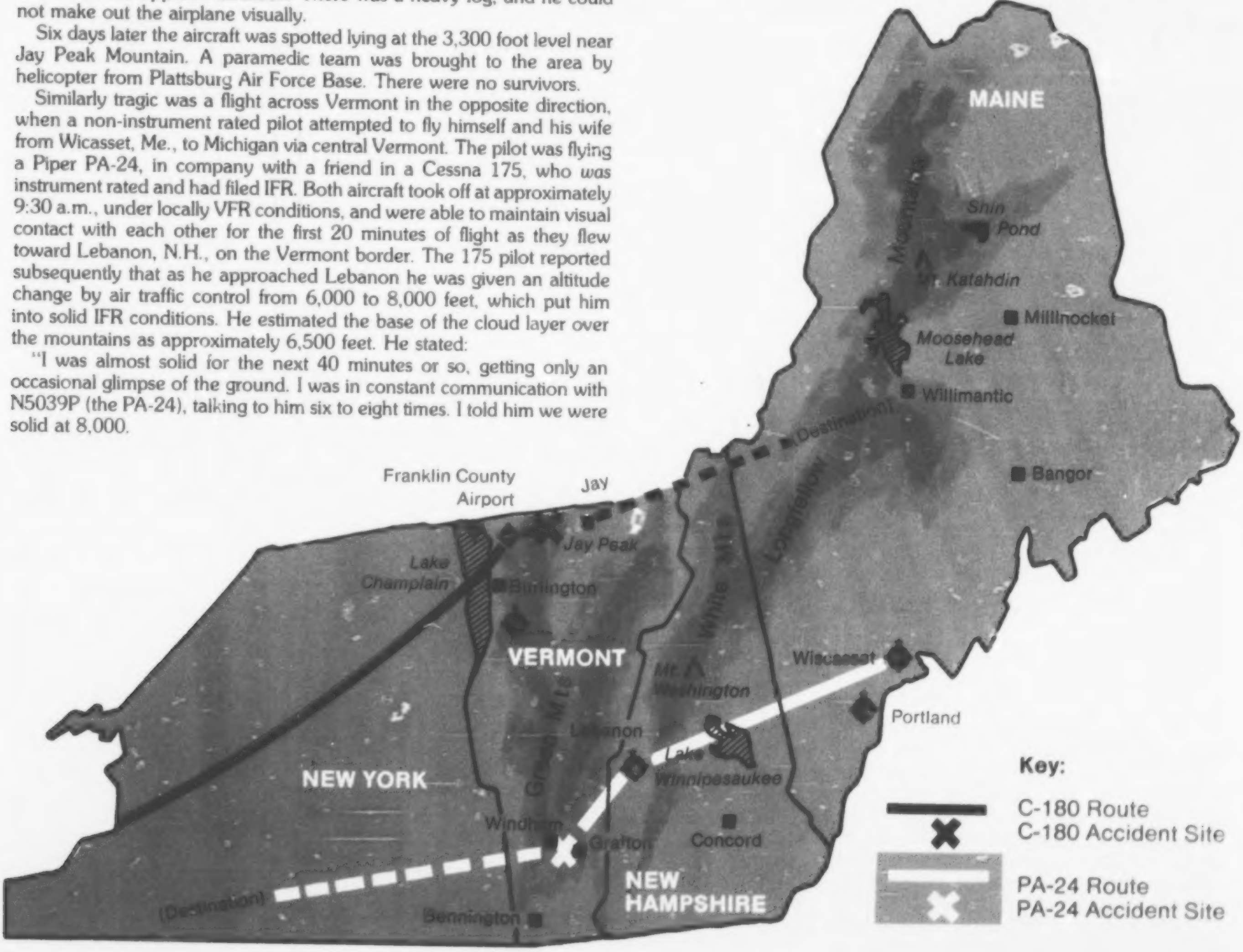
"We broke into a clear area over some lakes about 20 miles east of Lebanon VOR. I would estimate this hole to be about 30 miles across. I gave N5039P a position report, north on the 360 radial from Concord. He responded by giving his position as having crossed the Lebanon VOR and was now in the clear approximately 15 miles west of the VOR on Victor 496 at 5,500 feet. He stated that he had called Flight Watch for weather and was going to climb to 10,500 feet and said something about 'clear ahead or above'. We never heard from him again."

At 11:07 a.m. a witness on the ground in Grafton, Vt., a few miles east of Windham, saw an airplane spinning out of the sky to the west. He heard it crash approximately two miles away.

Another witness, a pilot who was flying over the town of Grafton at 11:55 a.m. at 4,500 feet, reported occasional rain showers and visibility 10 miles in haze, ceiling unknown.

The aircraft wreckage was located on the side of a mountain at the 2,200 feet level, approximately two miles east of Windham. The angle of impact was apparently vertical. All of the wreckage was found in a crater, which measured five feet deep and six feet in diameter. There were no survivors.

The Appalachian Mountains in New England may not offer any challenge to climbers of tall or difficult peaks, but they should never be taken lightly by pilots of small aircraft. The scenery is great, the fishing is fine, and the skiing is exciting, but the wind and the weather require your respect. Those small mountains are made out of very hard rock. ■



ASH SUNDAY

How seriously has Mt. St. Helens affected flying in the Northwest?

On Sunday morning, the 18th of May 1980, the sky over eastern Washington was obscured by a strange discoloration which brought the day to a premature close. Mt. St. Helens had erupted for the first time in over a century, with a sudden violence that caused over 100 deaths. By daybreak the next morning a carpet of volcanic ash covered a vast area of the northwest, as far as Wyoming and Montana. At some towns in the Columbia River Basin, east of the Cascade Mountains, like Moses Lake or Ritzville, the grey ash was ankle deep, and the sky was still black with particles suspended in the air. Local travel came to a standstill, cars were immobilized and aircraft grounded. Citizens donned hospital-type masks. Airports were closed and no one had any idea when they would re-open or how destructive the ash could be to aircraft exposed to it.

Today, over five months and a half dozen additional eruptions later, the problem has not gone away. Airport ramps, runways and taxiways have been cleaned up, and travel is back to normal, but the ash—an estimated two to six billion tons of it—will evidently remain in the environment for years to come, to be periodically stirred up by high winds or perhaps added to by more volcanic activity. Much ash is still evident in the grassy areas of airports and in the farm fields and slopes surrounding them.

Airmen, however, are learning to live with volcanic ash and to understand it. The chief concerns have centered on acidic content and abrasive effects. Analyses have shown that these factors vary considerably, according to direction and distance from the volcano, as well as from one eruption to another.

Present indications are that acidic content increases with distance from the volcano, as the sulfur dioxide from eruptions is converted to sulfuric acid from moisture in the air. Airports as distant as Caspar, Wyo., have experienced highly acidic fallout, quite capable of corroding metal, while in general the ash in Washington and Oregon has been nearly neutral—or even alkaline in some areas. The corrosion potential of acidic ash is increased, of course, by moisture, which is why it is considered important to remove highly acidic material from the airplane by blowing or brushing before washing it down.

The major constituent of the ash, silicon dioxide (about 65%), accounts for its abrasiveness. It will easily scratch glass, as well as aluminum and other metals. The very fine ash, measuring as small as one micron or less, usually can be removed from an aircraft surface by careful brushing without causing scratching, but operators located closer to the source, where the ash is noticeably heavier but not as acidic, have preferred to rely on hosing aircraft down.

The ash also has a high static charge. Following the first eruption, power lines at Yakima, Wa., were shorted out by arcing caused by infiltration of strongly ionized particles. In aircraft this could result in alternator or other electrical failure.

However, while several light aircraft have made forced landings because of engine stoppage due to ash in the induction system, to date the volcanic ash fallout on aircraft on the ground has not been linked to a single accident. This may be due to early warnings posted by FAA's Northwest Region to prompt remedial measures undertaken by pilots and operators. Operators of large fleets and FAA officials all anticipate that sooner or later maintenance problems related to ash will arise. This may take the form of cylinder or valve abrasion, seal leakage, brake or alternator failure, or other problems as yet undisclosed. But they see no reason why aircraft of all kinds may not be operated safely throughout the northwest, despite the continuing presence of volcanic ash on the ground and in the air, so long as certain simple precautions are followed. These include:

1. *Do not fly in the immediate vicinity of the volcano.* While geologists have learned to recognize from certain indications (so-called harmonic seismic activity) when an eruption is imminent, the mountain can also erupt without warning, releasing tremendous natural forces that could overwhelm any aircraft. Some observers are certain that the first aviation casualties will occur as a result of a large number of pilots recklessly flying around in the restricted area around Mt. St. Helens without prior approval or radar separation by air traffic control. There are approximately 40 cases of illegal penetration being investigated at the present, many of which are expected to result in pilot certificate suspension. In the event of an aircraft crash during a period of volcanic activity, it is unlikely that rescue teams could be sent to the assistance of survivors.

Several near-miss incidents have occurred in the Mt. St. Helens restricted area, despite frequent patrolling by FAA and Forestry Service aircraft. A recent incident involved a National Geological Survey helicopter which was hovering 100 feet above the mouth of the crater to allow scientists to scrutinize the interior. Suddenly, the scientists were startled to see a fixed-wing aircraft pass beneath them and disappear in a cloud of ash and steam.

2. *Keep it clean.* Ash fallout may occur even during inactive periods of the volcano, due to gusty winds or changing atmospheric conditions. Remove the ash from all aircraft surfaces as appropriate by water or air hosing or brushing. Taxiing speed should be kept low. Avoid taking off or taxiing over pavement where ash or dust has been stirred up by other aircraft. Wait till it settles. Rolling takeoffs are suggested whenever appropriate. Waxing the windshield and other aircraft surfaces may reduce abrasion from wind-borne ash. Paint abrasion on the face of a propeller blade or wing and empennage leading edges are good indications of airborne exposure to ash. Be especially careful not to use carburetor heat on the ground. Some of the ash particles are too fine to be filtered out of the air intake systems. Make sure air filters are serviceable. Make certain that drain holes are not clogged by ash.

3. *Watch exposed seals for leakage*, especially around oleo strut and propeller spinner. These areas should be wiped clean daily as well as before flight.

4. *Anticipate unusual brake and tire wear.* One operator of a large piston-driven fleet in Spokane has noted an increase in the rate of brake wear of about 40% and a 20-25% increase in tire wear from ash abrasion.

5. *Change engine oil and oil filters more frequently than usual*—unless spectrographic analyses show no increase in harmful metals in the oil. An increase of iron particles has been

noted in the Portland area.

6. *Expect possible problems with vacuum driven instruments.* Ash intake will affect bearing life and possibly the vacuum pumps as well.

7. *Monitor electrical power sources.* The high conductivity of the ash may short out some systems. Abrasion may increase wear on generator brushes.

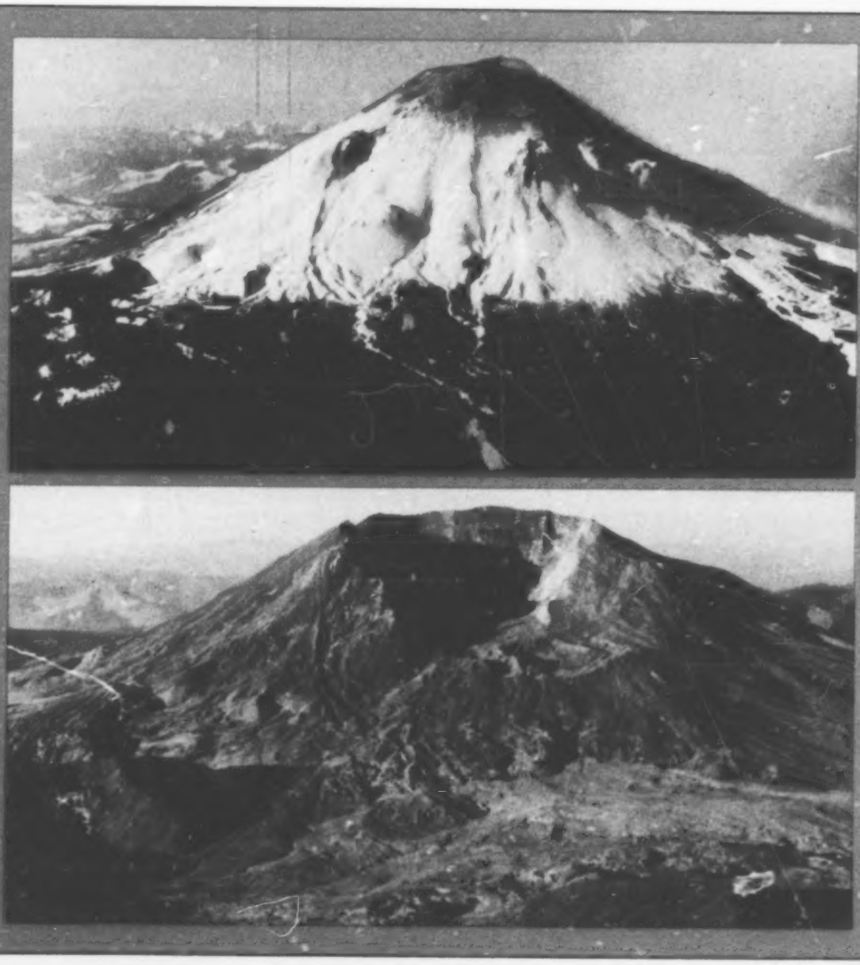
8. *Check pitot systems and drain holes.* Look for possible clogging or abrasion.

9. *Watch for bulletins from engine or aircraft manufacturers* on maintenance in fallout areas.

In short, we are talking about operating aircraft in an environment where the corrosive and abrasive pollutants have risen to a considerably higher level than normal and which are likely to remain above normal for many months or even years. There is no known safety reason to curtail operations, and in fact, the volume of traffic in the northwest has returned to approximately pre-eruption levels. Again, there is no indication of an increase in accidents related to maintenance. *However, an increased vigilance in pilot and operator maintenance practices is recommended,* at least until we have had more time to study the changed conditions as they affect aircraft.

Several billion tons of ash will be around for quite a while. ■

Yakima (Wa.) Air Terminal appears covered with sand. Ash particles are finer than sand grains.

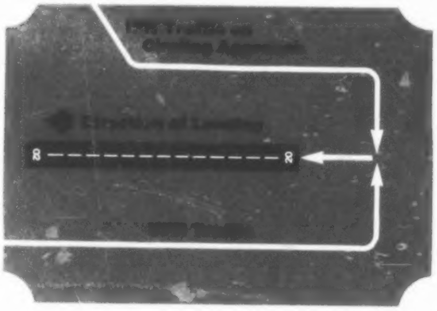


Before and After. Violent eruption of Mt. St. Helens in Washington State reduced mountain's height from 9,600' to 8,400' and blew billions of tons of ash into the atmosphere. A "rotten egg" odor near volcano is evidence of presence of corrosive sulfates from continuing exhalations. Use of the airspace within a 10-mile radius of Mt. St. Helens is restricted to official or accredited press use and requires prior air traffic approval. The area is patrolled.

turns to land

If you are making an instrument approach to an uncontrolled airport with a circling-to-land procedure, and you break out in the clear to find VFR conditions prevailing at the airport, are you obliged to complete your landing using only turns in the direction indicated at the airport? Or can you turn in any direction that appears to you to be safest?

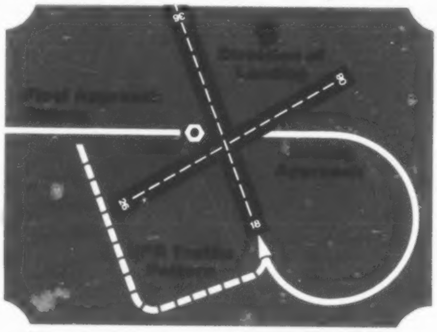
This question has troubled a number of instrument rated pilots lately, but it is also of concern to VFR pilots. On a day when the ceiling is too low to encourage VFR crosscountry flight, some VFR aircraft could be in the pattern practicing landings at a time when IFR traffic has been cleared to an instrument approach. *Does this mean that two aircraft could legally be approaching the same runway threshold at the same time from opposite directions?*



Strangely enough, it does. Although FAR Part 91.89 states that all turns at an uncontrolled airport are to be made to the left (unless otherwise indicated by a segmented circle or flashing amber light), a pilot on an instrument approach governed by circling minimums is authorized by the Airman's Information Manual to "maneuver the shortest path to the base or downwind leg, as appropriate . . ."

The pilot is cautioned that VFR or other flying may be in progress at the airport, and that he should consider standard direction turns, but he is not limited to such turns. The direction of his turn(s) onto final will depend upon where he is when he establishes visual contact, in relation to the approach end of the runway, and such factors as cloud cover, extent of authorized circling area, wind direction, and visibility—as well as the presence of VFR traffic in the pattern.

A circling-to-land procedure is required for any instrument approach where the final segment of the course does not line up with the approach end of the runway, so that the pilot is unable to land straight in. The approach course may terminate at some point adjacent to the runway, at an intersection of several runways, or even at the departure end of the runway. From this point, it may not be possible to complete a landing without maneuvering somewhat contrary to the airport traffic pattern.



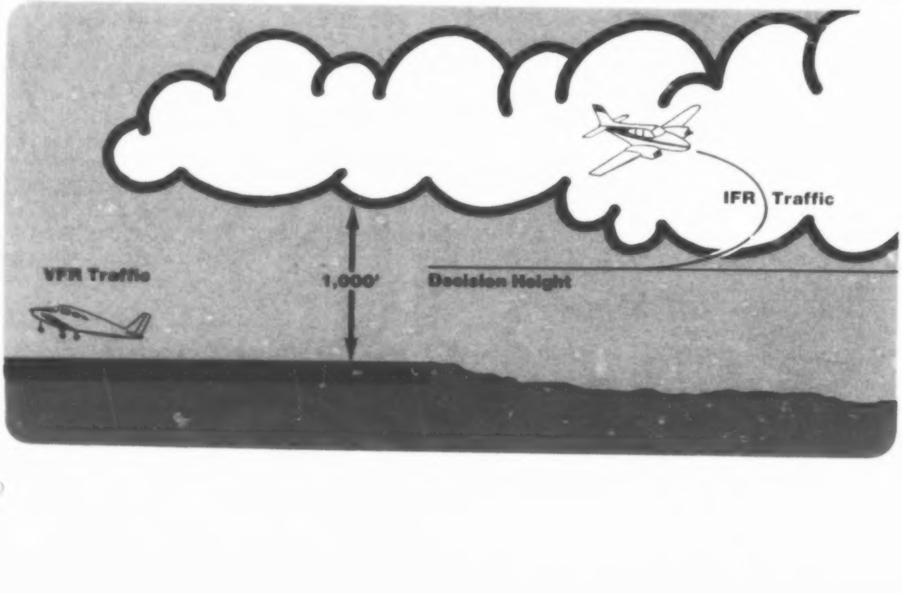
Depending upon the terrain and weather phenomena, an aircraft may experience IFR conditions all along the early segment of the approach and nevertheless encounter ceiling and visibility conditions well above VFR minimums at the airport.

Since the IFR aircraft, when cleared for this approach, is given ATC separation only from other IFR aircraft, the pilot must assume his own responsibility for staying clear of any active VFR aircraft while preparing to land. He should have thoroughly familiarized himself with the terrain features of the airport and be able to anticipate the direction of flow of VFR traffic under prevailing conditions. If possible, he should contact UNICOM on the field to learn if it is in use by VFR aircraft. Turns against the normal pattern direction should only be made when such a maneuver is clearly in the interest of greater safety in landing and presents no threat to aircraft in the pattern. He should always consider executing a missed approach when any aspect of a landing appears to jeopardize safety.

On their part, pilots who operate VFR at any uncontrolled airport with an instrument approach can increase the safety of their operations by anticipating the flow of inbound IFR traffic, in conditions of low ceilings and poor visibility. This information is normally available from airport management or from instrument approach charts.

VFR pilots should be prepared to avoid traffic that is landing but not following the pattern.

Conditions of this kind are infrequent, but they occur often enough to deserve the consideration of all concerned pilots. Expecting the unexpected means no unhappy surprises. ■



THE ORIGINAL FRENCH CONNECTION

Costes
Bellonte

To most airline passengers on a modern jet, the only significant difference between flying from New York to Paris and vice versa is that the latter trip takes about an hour longer because of prevailing winds. To pilots in the 1920's seeking fame and fortune for the first nonstop continent to continent crossing, the east-west route was a virtual impossibility. Headwinds of 50 mph could extend the 3,600 mile journey by 50%, given contemporary airspeeds.

The first attempt was made by Charles Nungesser, France's third ranking WWI ace. Nungesser had always emerged victorious from his wartime adventures, despite being wounded 17 times. Once he accepted a challenge to single combat with a German ace, and was undaunted when not one but six came to oppose him, led by a pilot named Hermann Goering. Nungesser flew straight into the German squadron, blasted two from the sky, and escaped when he ran out of ammunition.

Nungesser found peacetime barnstorming inglorious. How better to regain his lustre than by completing a flight everyone said was impossible: Paris to New York!

Friends persuaded him to take along navigator Francois Coli, another wartime flyer, who fitted well with Nungesser's devil-may-care image. They acquired backing and a long-distance Levasseur PL-8 biplane they named *L'Oiseau Blanc*. It had a fuel capacity of [illegible] gallons, a single 450 hp engine, and a cruise speed of 100 mph.

Every unnecessary ounce was sacrificed for the airplane's range, calculated at 4,000 miles in still air. Like many early aviators, Nungesser believed that an equivalent weight of fuel would be more useful than a radio or survival gear. Said Nungesser, "I am thinking of flying to New York, not of saving my skin."

On the evening of May 7, 1927, favorable weather over the North Atlantic was reported, but the next morning it was raining. Nungesser, knowing that Lindbergh and other Americans were poised to fly the ocean, decided to risk the imperfect conditions.

At 5:00 a.m. he and Coli took off. All France held its breath as favorable news of their progress trickled in. But *L'Oiseau Blanc* disappeared over the Atlantic, never to be seen again.

Two weeks later Charles Lindbergh made history, but the far more difficult east-west route continued to challenge airmen and claim lives. Twenty more unsuccessful attempts were made in the next three years, bringing the number of fatalities to twelve. Two partially successful attempts failed to make it to New York and landed at Newfoundland. It was up to another pair of Frenchmen, Dieudonne Costes and Maurice Bellonte, to succeed where Nungesser had failed.

Costes was a WWI hero out of Nungesser's mold. A licensed pilot at 16, and a flying terror on the Mediterranean front, his flying career was noted for a chronic inability to accept discipline. After the war he flew commercially on the Paris-London run, where he met Maurice Bellonte, a soft-spoken mechanic-turned-pilot, expert navigator, and wireless operator. Costes was first to fly the South Atlantic, and holder, with Bellonte, of the world long-distance record (Paris to Manchuria, 4,910 miles).

He and Bellonte painstakingly examined the histories of previous North Atlantic flights. One thing was clear: enormous fuel reserves were not the only answer to prevailing winds and the Newfoundland fog and storms. Their aircraft, similar to Nungesser's was one of the best long distance planes available. The 650 hp single engine, open cockpit Breguet 19 was literally a flying gas tank, carrying almost 1200 gallons of fuel—enough to travel 5,000 miles in still air.

Nevertheless, Costes and Bellonte concluded that Nungesser's lack of weather briefing and instruments for blind flying had probably been his downfall. Their *Question Mark* was equipped with the latest instrumentation, including the newly invented artificial horizon. They also insisted on the most powerful radio they could find, one with a 600-mile range that would keep them informed through ocean liners, on weather conditions and enable them to obtain directional fixes from ships equipped with the loop directional finder.

Finally Costes had patience, and he was determined to wait for ideal weather, even if this meant postponing the flight until next year.

On September 1, 1930, a rare 24 hours of fair weather and easterly winds over the North Atlantic was forecast. The *Question Mark* took off, heavily laden with 4½ tons of fuel, emergency gear, and a cornucopia of provisions, including fruit, cake, soup, coffee, champagne, and several pounds of sugar cubes.

Over the mid-Atlantic, they zig-zagged around potentially turbulent areas instead of following the shorter great circle route. The flight soon became a matter of sheer physical endurance. Costes wrote: "A pilot has the sensation of being completely at one with his machine . . . the roar of the 650 hp engine fills the ears and hits you in the pit of the stomach, like the violent beating of the heart you hear after hard exercise."

Hours droned on over the seemingly endless expanse of ocean. Bellonte released smoke flares to determine wind direction and kept in constant touch with ships ahead of them. They flew for 20 uneventful hours with clear skies and tailwinds, but as they approached the Grand Banks off Newfoundland, they encountered fog so thick Bellonte could not see the wingtips. By daybreak the fog had cleared, but now the gentle tailwinds were gone, and soon the *Question Mark* was buffeted by increasingly stronger headwinds, gusting up to 100 mph. They flew on, but the unceasing headwinds and dense black storm clouds convinced them to detour yet again. They flew south for 100 miles, looking for a break in the impenetrable cloud banks.

Soon they sighted Nova Scotia, but now an unexpected rainstorm drenched their open cockpit, making their instruments almost unreadable. Not only was the small wind-driven generator that powered their radio put out of commission, but they had detoured an estimated 600 miles dodging storms, leaving barely enough fuel for the final leg and no margin for error. Fortunately, they were able to follow the coastline visually until they landed at New York.

And so, after flying 37 hours, with the fuel tank almost dry, the two exhausted Frenchmen touched down safely on Long Island, where they were carried off on the shoulders of an enthusiastic mob and congratulated by Charles Lindbergh on a feat which he declared greater than his own.

France was wild with joy. Monuments were erected to the new heroes, as well as to the late, lamented Nungesser and Coli. Nungesser was never really forgotten, least of all by an old enemy. When France was occupied by Nazi Germany, the chief of Hilter's *Luftwaffe*, Hermann Goering, ordered his monument destroyed. Costes and Bellonte's remained intact.

BUSCH FLYING. World's largest non-rigid hot-air blimp, seen here on its inaugural flight in Bedford, Mass. Although lift is similar to that of a conventional hot-air balloon, this blimp, manufactured by World Balloon Corp. of New Mexico, is not at the mercy of the winds. A 180-hp, four-cylinder airplane engine powers a propeller, and the blimp is steered by an inflated rudder. The cigar-shaped nylon envelope is 175 feet long and weighs 4,000 lbs when fully inflated. The first hot-air non-rigid dirigible, a 120 foot blimp, was manufactured in 1975 by Raven, Inc.

Latest Advisory Circulars on Aircraft, Airport Maintenance

Airmen who are interested in specifications governing their airplanes' equipment, or who would like to know where to go for approved mechanic training and certification, or where to get repairs done by the nearest certificated shop, may avail themselves of some of FAA's latest free advisory circulars.

AC 20-110, "Index of Aviation Technical Standard Orders," lists current and proposed FAA specifications for all materials, parts, equipment, and appliances used on civil aircraft. Since not all equipment has to be built to these specifications, this index could help pilots select the right equipment for a given operation.

All FAA-certified mechanic schools as of March 1, 1980, are listed in AC 147-2U, "Directory of FAA Certificated Maintenance Schools." This list specifies the type of training given in each school and the address. Some, but not all, of these schools have FAA-designated mechanic examiners to certify their candidates. See AC 183-32A, "FAA designated Maintenance Examiners Directory." A state-by-state listing (including type of repair) of aviation repair shops can be found in AC 140-7A, "FAA Certificated Maintenance Agencies Directory."

Also among the new advisory circulars is "Specifications for Obstruction Lighting Equipment," AC 150/5345-43C, which lists requirements for lighting airway obstructions en route and at airports. Pilots will find this useful for determining what kind of lighting can be expected on obstructions at or near unfamiliar airports, and airport operators can learn what type off lighting is required for any obstructions near their airports.

Write for these publications to DOT Publications Section, M-443.1, Washington, DC 20590. Request each by name and AC number.

Aviation Doctors Needed

Doctors interested in a career in aviation medicine, either in administrative work or aeromedical research, are needed by the Federal Air Surgeon's Office. For details on qualifications for these positions or other information, contact DOT/FAA, Federal Air Surgeon, AAM-610, 800 Independence Ave., S.W., Washington, DC, 20591.

Return to Large N-numbers Proposed for Most Aircraft

Three years ago sport aviation buffs and hobbyists got FAA to reduce the size of registration number for aircraft with a maximum speed of 180 kts or less from 12 inches to 3 so that the numbers would fit in with personal color and design schemes. Since then, FAA has had trouble enforcing certain regulations for lack of ability to read the smaller numbers at a distance. Drug smugglers as well have profitted from this difficulty in identification by pursuit aircraft, and some tower and ground controllers have had problems in identifying aircraft on large airports.

Consequently, FAA has proposed returning to the 12-inch letters and numbers for new airplanes and for older ones when they are repainted or the numbers refurbished or changed. (Gliders, certain experimental aircraft, and home builts would be exempt from the rule.)

Comments on the proposed rule change should be sent as soon as possible to FAA Office of Chief Counsel, Rules Docket, AGC-204, Docket 20404, 800 Independence Ave., S.W., Washington, DC, 20591.

Meteorologists Join ATC Centers

Pilots can look forward to more eficient weather avoidance for IFR flight planning, thanks to a closer tie established with the Weather Service and FAA. As of October 1, 1980, all 20 Air Route Traffic Control Centers in the continental U.S. will have National Weather Service Meteorologists on continuous duty to provide Center controllers with satellite weather data that may affect traffic routing.

The professional meteorologists will use satellite pictures and weather radar to determine intensity of storm cells and to predict where weather systems will move, so that center controllers can adjust IFR traffic flow in the area accordingly, well ahead of peak traffic periods. VFR traffic will also benefit, as the Center-based meteorologists will update weather information for pilot advisories to control towers, flight service stations, and the Enroute Flight Advisory System (Flight Watch).

Aviation Growth in the 80's

Aviation enthusiasts seeking a glimpse of the industry's future are invited to attend the sixth annual Aviation Forecast Conference October 21, 1980. The conference, in the Capitol Hilton in Washington, DC, will feature speeches by FAA Administrator Langhorne Bond and CAB member George Dalley, panel discussions on projected aviation growth rates, and the release of the publication, "Aviation Forecast—Fiscal Years 1981–1992."

Cost of the conference, including luncheon, is $20.00. Registration information may be obtained from Gene Mercer, AVP-120, Office of Aviation Policy, 800 Independence Ave., S.W., Washington, DC, 20591. If you are unable to attend but would like a copy of the publication, contact Mr. Mercer at the above address.

Flight FORUM

• BFR and High Performance

Most of my flying time has been logged in so-called high performance airplanes, beginning with the PT–17 and WWII bombers. Currently, I fly Cherokee *Arrows* and *Mooneys*, and each of my Biennial Flight Reviews have been taken in one or the other.

At a recent flight safety lecture we were told that our logbooks must be endorsed under FAR 61.31 for us to be found competent to fly high performance aircraft. If this is true, why didn't the BFR instructor also include an endorsement? Without this endorsement, am I in violation of FARs? If so, possibly there are many pilots that also believe the BFR in an aircraft ensures compliance with all requirements for all aircraft.

Raphael J. Janer
New York, NY

You are not required to have a flight instructor endorse your logbook for high performance aircraft. If flight time in such aircraft had been acquired before November 1, 1973.

• Discouraged Pilot

Thanks for the information about the revision to FAR Part 135 ("News," March/April 1980). I had had thoughts of trying to make a living as a commuter pilot of a single-pilot aircraft. The cost of 100 hours of time before I could gain my first revenue dollars is enough to stop me. I won't be part of any accident under this rule since I won't be flying.

Thomas Stinson
Chula Vista, CA

The rule addition, FAR 1351.105, requires more experience in make and model for pilots-in-command of one-man crews of commuter aircraft. The change was prompted by a significant increase in commuter accidents. Statistics indicated insufficient experience was a factor.

• In Praise of Voltmeters

Your article "In The Dark" (May/June 1980) strikes a responsive chord. The electrical battery-with-generator systems are generally one of the hardest worked systems in any aircraft—especially as more and more demands are made on it with additions of more avionics.

One important additional meter that really ought to be standard in all aircraft is the *voltmeter*. This meter indicates battery condition even *before* an engine is cranked. It indicates the drop as the engine is cranked, and when it is fired up, it indicates the voltage being fed to the battery. Nothing is more satisfying than to see the needle steady in the green no matter how many switches are turned on.

Loadmeters are valuable, but they must be coupled with a voltmeter for more accurate indications of the health of the electrical system.

I. Groupp
Venice, CA

Many of the newer aircraft now have voltmeters, or over- and under-voltage lights, with an ammeter.

• Flexible Flash

Compliments on "In The Dark," your May/June warning about electrical failure. My prestart checklist includes a special flashlight that fits in my breast pocket; its flexible neck points where I need light, hands off. I thought I'd pass it on.

Sander Schimmelpenninck
Oakville, Ont., Canada

Sounds like a winner.

• Surface or Airborne?

FAR 91.10 states "no person may operate an aircraft *other than for the purpose of air navigation*, on any part of the surface of an airport used by aircraft for air commerce, in a careless or reckless manner . . ." The phrase "other than for the purpose of air navigation" seems to justify careless operation at any other time.

Glenn R. Johnson
Grand Junction, CO

FAR 91.9 states that no person may operate an aircraft in a careless or reckless manner and pertains to any operation for the purpose of flight, including taxiing to the runway for takeoff. FAR 91.10 refers only to surface operations not *for the purpose of flight, such as maintenance, e.g., taxiing to the repair shop.*

• Instrument Instruction

Instrument instructors holding only a flight instructor, single-engine certificate have been giving instrument instruction in multi-engine aircraft for a long time. The only requirement was that they hold a multi-engine rating and meet the currency requirements. There is some question in the San Juan area now whether according to new Part 61 this can still be done. I would appreciate a correct interpretation.

Frank Ramirez
San Juan, Puerto Rico

A flight instructor with ASEL and instrument ratings on his instructor certificate need not be multi-engine rated to give instrument instruction in a multi-engine airplane if the person receiving the instruction is so rated and is current. Otherwise, the instructor must have an AMEL rating that is current on his pilot certificate.

• Instrument Time and Day Time

I have a question concerning the proper logging of flight time according to FAR 61.51(b)(3), "Conditions of Flight." If I make a two-hour IFR daytime flight, one hour only in clouds with the other in clear weather, I know I can log only one hour of actual instrument, but how is the daytime logged? One hour or two?

Paul W. Kolody
Export, PA

You flew two hours in daytime, so log two hours in the "Day" column of your logbook. Only one of those hours was in instrument conditions, so log only one hour in the "Actual Instrument" column.

• Student In-Command

Can a student pilot log his solo time as pilot-in-command time in the hopes of applying the PIC time to a later certificate, such as commercial?

F. K. Carter
Greensboro, NC

Affirmative. FAA's General Counsel has interpreted FAR 61.51(c) to allow the logging of student pilot solo time as PIC time because the student is the sole occupant of the aircraft.

• Allow Us To Rephrase

"The Weather Game" (July/August 1980) was a very interesting and entertaining article; however, I came across something that must be a typographical error. The article states that "NAVAIDS *with* voice capability are identified on sectional charts by a line under the frequency." I believe the line means *without* voice.

Also, it would have been nice at the end of the article if you had said the game is not finished until the flight plan is closed, because unless you close it, someone is going to track you all the way back to square one.

Paul Levine
Caldwell, CA

You are right on the mark. "With" instead of "Without" was a typesetting error.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Don't Fence Me Out!

I take objection to portions of the article "TCA and the VFR Pilot" (May/June 1980). The article states at one point that "normally the pilot . . . will be given vectors for flying through the (TCA) area." More times than not when I have requested clearance through a TCA, although fully equipped, I have been denied it, IFR or VFR resulting in long roundabout diversions that cost time and fuel. Atlanta and Los Angeles are noted for this.

I can understand denying passageway to transiting traffic in times of heavy arrivals and departures, but I have been refused even in off-peak hours, early in the morning or late at night.

Furthermore, the article states, "Delays and detours can be minimized if the pilot contacts approach control well before reaching . . . the TCA." My experience has been that this does not help *at all* in obtaining clearance through a TCA.

TCA's are a valid topic for *FAA General Aviation News*, but this is a magazine known for giving straight answers. Peak hours from dawn to dusk? Ridiculous!

Name Withheld

In point of fact many TCA's—Los Angeles, O'Hare, Atlanta, New York, to name a few—do handle "peak" traffic all day long and far into the night. Air traffic control understandably gives first consideration to aircraft requiring the use of airports within the TCA, and at times the area would become saturated if the tower attempted to handle more traffic.

Ability to accommodate transiting aircraft varies from one TCA to another, depending not only on traffic volume but also on terrain and route configuration. For example, Washington National Airport closes to air carrier traffic at 10:30 p. m., and consequently, a great deal of traffic is sometimes handled between 6:00 p.m. and closing time. However, IFR or VFR traffic and even some dual training flights are permitted to transit during these busy hours if the route of flight is well away from National's approach and departure paths over the Potomac River.

One phrase in our May/June article on TCA's could be misleading. We did not intend to imply that aircraft could transit a TCA at any time, but only when airport traffic density allows. However, if controllers in a TCA continually refuse to allow IFR or VFR fully equipped traffic to transit, for no ascertainable reason, you may seek help from the Chief, Terminal Operations and Procedures Branch, AAT–320, Federal Aviation Administration, Washington, DC, 20591.

INSTRUMENT CORNER

• I'll Show Him!

On more than one occasion, I have been assigned a Localizer Back Course approach at an airport also having a full ILS when the ceiling was well below Localizer minimums but above ILS minimums. Should the pilot immediately reject the assignment or execute it to show ATC that a landing is not possible by that route?

Cyril Toker
Potomac, MD

If the localizer BC approach is in use—at an airport which also has an ILS approach—when the weather is below BC minimums, it may mean the ILS is unusable for one reason or another. The only clearance available would be the BC, regardless of the weather, and the pilot must decide whether or not to continue. At no time continue a questionable approach without first requesting clarification of any clearance that seems unsafe.

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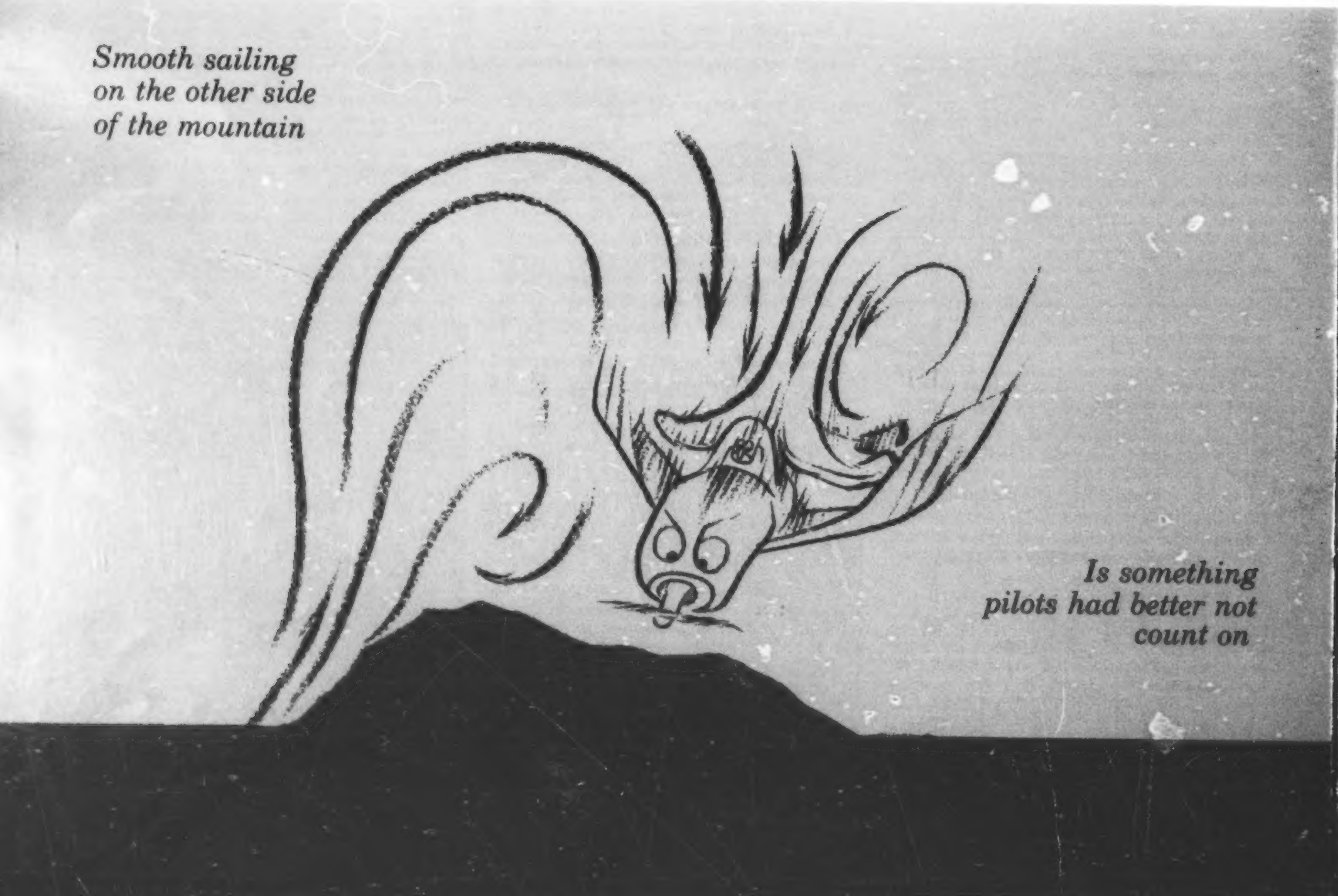
Smooth sailing
on the other side
of the mountain
Is something
pilots had better not
count on

FAA
general aviation
NEWS
NOVEMBER – DECEMBER 1980
A DOT / FAA FLIGHT OPERATIONS SAFETY PUBLICATION

In this issue:

VFR at Night

FAA GENERAL AVIATION NEWS

**DEPARTMENT OF TRANSPORTATION/
FEDERAL AVIATION ADMINISTRATION**

**NOVEMBER – DECEMBER 1980
Volume 19, Number 6**

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BRIEFS

BARGAIN PARTS have proved to be no bargain for owners of vintage aircraft who have problems obtaining replacement components for their early model aircraft that are FAA-approved. Recently unapproved wing lift strut forks of clearly inferior workmanship were discovered on Piper model 12 and 14 aircraft when these vital parts were removed for a routine inspection. Advertisements for hard-to-get parts at low prices appear frequently in aviation publications. Pilots who want guidelines for standards of aircraft components should send for a free Advisory Circular, 20–62C, "Eligibility, Quality, and Identification of Approved Aeronautical Replacement Parts," from DOT Publications Section, M–443.1, Washington, DC, 20590.

SHELLING OUT. Shell Oil is closing its east coast Avgas distributorship by the end of 1980 for lack of a refinery. About 30 fixed base operations in the northeast will be affected; it is not expected that the slack will be fully taken up by other manufacturers. Pilots flying in the area next year would be wise to check availability of Avgas at their destinations before takeoff.

NOT SO SWEET LANDINGS. Grabbing a chocolate bar for a burst of energy in flight may not be such a good idea, especially if you have been flying at high altitudes without supplemental oxygen. Recently, a pilot who had flown 90 minutes at 12,500 to 13,000 feet became disoriented when he descended and turned to land, nearly losing control of the aircraft. His only meal for the day was a candy bar, eaten en route. Investigating aeromedical doctors believe that the disorientation was brought about by a combination of hypoxia and hypoglycemia (low blood sugar)—the latter condition caused by eating candy on an empty stomach. Balanced meals are best for optimum piloting.

PITTED PROPS. This being the season of aircraft inspection and servicing for many agricultural operators, it is important not to neglect the condition of the propeller. In two recent accidents, corrosive pitting by agricultural chemicals caused propeller fatigue cracks that went unnoticed until the propellers separated from the aircraft in flight. Both pilots were fortunate to survive. Most manufacturers recommend that propellers on agricultural aircraft be removed from hubs and inspected every 18 months, and overhauled at given intervals.

MILITARY CONFLICTS. 'Tis the season for shorter daylight hours and long shadows. If you fly near or in areas of low-altitude, high-speed military operations, poor light could make it more difficult to see high-speed military aircraft on maneuvers at your altitude. Sectional charts, flight service stations, and the AIM have information on the locations of military training routes and hours of operation. Full details are in FAA Advisory Circular 210–5A, "Military Flying Activities" (free from DOT Publication Section M–443.1, Washington, DC, 20590). Civilian pilots are in a much better position to avoid conflicts than military airmen.

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VFR at Night

Darkness + Moisture = Nightmares

Night flying tends to become more frequent during the winter months, when the daylight hours are fewer. There is no evidence to prove that the night environment is less safe than daytime, but there are some strong indications that many low-time, non instrument-rated pilots are being victimized by certain night weather conditions beyond their competence.

According to reports of the National Transportation Safety Board during the 12 calendar months of 1978, some 61 non instrument-rated pilots crashed in flight or when approaching to land, as a result of deteriorating weather even though they took off in VFR conditions. These were pilots of all ages, from all walks of life, using a variety of aircraft. Their average logged time was less than 900 hours; few held a certificate higher than private pilot.

The predominant factor in the accidents was *worsening visibility*. In many cases the weather was actually above VFR minimums at the destination airport, but the pilot encountered en route patches that were marginally VFR or worse. Consequently the pilots were unable to maintain positive reference to the ground. It is often possible to maintain VFR in the daytime despite the presence of fairly low ceilings, precipitation, haze or smoke, but night VFR is another matter. These phenomena tend to soak up available light, and to screen out terrestrial as well as celestial illumination, often to the extent that continued positive visual reference to the ground is impossible. Unwary pilots stray off course, miscalculate their position and collide with the ground. The death-toll of these VFR-at-night accidents is frightening. Fifty-four of the sixty-one reported for 1978 were fatal, resulting in 120 fatalities. This is a fatal accident rate of almost 90 percent.

A grim example of this type of accident occurred on November 22 in the Shenandoah Valley of western Virginia. The 60 year old pilot, who had accumulated about 2,000 hours, had no instrument rating and no limitations other than wearing glasses for night vision. He was flying a Beech *Bonanza* out of Shenandoah Valley Airport, which is centrally located in the valley at an elevation of 1,201 feet. To the east the Blue Ridge mountains rise to nearly 4,000′ and the slightly higher Massanuttens lie to the west. A characteristic bluish haze frequently obscures the ridges and sometimes extends over the valley.

The round trip flight to Charlotte, N.C., had originated that morning in clear weather. The pilot picked up two friends at the airport in Charlotte and departed at 4:22 p.m. The current area forecast called for ceilings of about 2,000′ with visibility five miles in haze. Ceilings were expected to be marginally VFR after 7:00 p.m.

An hour after taking off, the *Bonanza* pilot, who had not filed a flight plan, contacted Roanoke Approach Control and requested weather information for Shenandoah Valley Airport. (The airport is about 50 miles north of Roanoke.) The controller explained that he could only give weather for the Roanoke area, where VFR flight above 4,000′ or 4,500′ appeared doubtful. The *Bonanza* pilot was advised that Roanoke FSS might have some more specific information about weather in the valley or around Shenandoah Valley Airport (there was no weather station at the airport at the time).

However, the *Bonanza* was unable to contact Roanoke FSS, and about five minutes later reported back to Roanoke Approach Control and requested radar surveillance. Radar contact was established at seven miles northeast of the Henby intersection, altitude 5,500′. The pilot was advised to advise Approach Control if he changed altitude. After confirming the frequency for the flight service station he made several more attempts to contact Roanoke FSS, without success.

Shortly before 6:00 p.m. the *Bonanza* was advised that radar advisories from Roanoke could no longer be provided, and advised to contact Washington en route traffic control center. The pilot acknowledged. No further transmissions were received from the *Bonanza* by Air Traffic Control.

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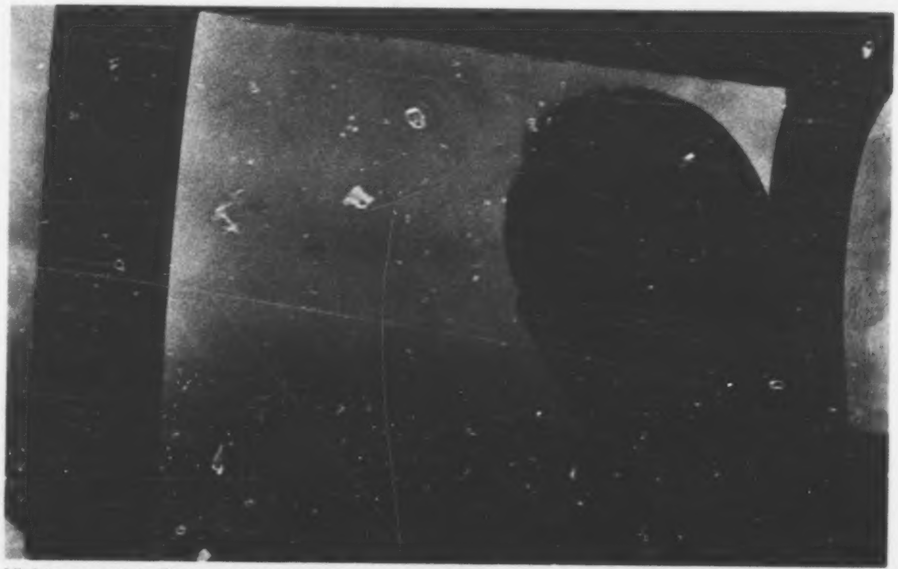


Night approach to Shenandoah Valley Airport. Haze and fog shroud the Massanutten Mountains to the west. Combination of fog and haze results in indeterminate visibility and obscures landmarks.

Shoshone Valley in western Wyoming, one of the VFR routes between Cody and Jackson Hole.

At 6:20 p.m. Roanoke Approach Control made several unsuccessful attempts to contact the aircraft, which had disappeared from the radar scope. There was no reply.

By this time it was pitch dark in the valley. The *Bonanza* had continued northbound, but apparently the pilot was unable to see the lights of his destination airports under the layer of haze and strayed off course. The aircraft was located six days later, 200 feet below the ridgeline of the Massanutten Mountains, at an elevation of 4,100′. All three occupants had perished on impact. A flight which might have experienced little trouble during daylight hours turned into a tragedy after dark.

Fog

The most frequently mentioned obstruction to vision at the site of night flying accidents is *fog*. The pilot who is flying VFR at night under a relatively low ceiling must depend upon visual reference to maintain a safe altitude above the ground. At night fog has a way of insidiously masking the outlines of hilltops, towers, wires, etc. Fog also has a nasty habit of materializing unexpectedly after dark whenever the terrain cools off sufficiently and there is moisture present in the air. The pilot who elects to fly VFR at night, under a marginally low ceiling, by hugging the contour of the earth, is a likely victim of this phenomenon.

On October 1 a 19 year old pilot in a Cessna 152 landed at Franklin-Wilkins Airport, in Lexington, Ky., shortly after 5:00 p.m. He was completing a cross-country round trip flight, Cahokia, Ill., to Little Rock, Ark., and return in preparation for his commercial certificate. The forecast for the next segment of his flight, to Nashville, indicated below VFR minimums, and the pilot was not instrument-rated. The forecast for Nashville at his ETA was, *Ceiling 500 feet overcast, visibility two miles, rain showers, fog*.

The manager of the airport at Lexington, which is attended during daylight hours only, offered to drive the pilot into town so that he could find lodging for the night. However, the pilot decided he would get some sleep in the airplane and be ready to take off as soon as the weather broke. The manager locked up his office at 7:00 p.m. and left.

Using the Cessna's radio, the pilot contacted the flight service station at Jackson, Tenn., several times during the evening requesting Nashville weather. Instrument flying conditions persisted. At 12:15 a.m. the pilot called the Memphis FSS by telephone and was given the updated Nashville weather report and forecast. Nashville was now marginally VFR (*500 feet scattered, 2,000 feet overcast, five miles visibility*). The forecast called for continued improvement up to 4:00 a.m., and then worsening from ground fog. The pilot indicated he would "just as soon go now as anything" and took off.

However, the Nashville forecast was amended at 1:22 a.m., calling for a variable ceiling 200 to 300 feet obscuration, visibility one-half to two miles, fog. An official observation at Nashville thirty minutes later reported, *Ceiling measured 300 feet broken, 2,000 feet broken visibility two miles, fog, temp 62° F.* There is no indication the pilot was aware of the amended forecast.

The flightpath from Lexington took the pilot over a sparsely settled wildlife refuge area along the Tennessee River, a damp and humid area. The adjoining terrain is hilly and wooded. The aircraft was not heard from again. A week long search of the area between Lexington and Nashville turned up nothing.

Six weeks later a party of hunters came across the aircraft wreckage and the deceased pilot at a site estimated as 20 miles northeast of Lexington. The 152 had crashed in a flat attitude on a heading of 290°, suggesting that the pilot may have encountered fog between Lexington and Nashville, attempted to turn back and struck a hillside in the dark. He had logged a total of 134 hours, 4.4 at night.

Icing is another worrisome hazard to pilots who attempt VFR night flights when weather reports show significant moisture in the environment. Especially in winter, an aircraft that descends rapidly from altitude to a warmer, moist level may receive an immediate coating of ice, which could impair aircraft performance at a critical phase of flight. The pilot may be unable to see the ice buildup in the dark, and fail to compensate for it. In some cases following such a descent, the aircraft windshield has iced over abruptly, producing an "instant IFR" condition for a very startled pilot.

Ice

A case in point involved a physician who was flying a Grumman American *Tiger* over the Teton Wilderness Area of western Wyoming. The 55-year old doctor had practiced in Cody, Wy., but was now living semi-retired in Jackson Hole. He had developed an interest in flying, and frequently flew over to visit his married daughter who lived in Cody; this was to be his annual Christmas visit.

He had planned to take off in the *Tiger*, which he owned, on the morning of December 23, but he was called to the hospital in Jackson to attend the victim of a skiing accident, and did not get back to the airport until after noon. By this time Cody was reporting, *Ceiling indefinite 2,000 feet obscured, light snow showers in the area, visibility one and one-half miles*. The doctor sat patiently in the pilot's lounge and read a magazine until the next report came out, at 3:15 p.m. The weather at Cody had improved slightly, although it was still no better than marginally VFR.

The doctor was not instrument-rated and had logged less than 200 hours, but he knew the route well. He chief concern was the weather over the higher portions of his route. His normal flight path took him over the 10,000 foot mountains that rimmed Jackson Hole to the east and on to the Dunoir VOR. Then he would track outbound from Dunoir on the 060 radial until he picked up the South Fork of the Shoshone River and followed it into Cody, descending with the terrain and following the river to avoid the sheer slopes that rose over 12,000′ on either side. There is no weather station in the area.

He telephoned the flight service station at Worland, on the eastern side of the mountains, and asked for en route reports and a forecast. The forecast indicated deteriorating weather conditions overnight over the entire route, with sleet or snow showers by morning. Two recent pilot reports indicated VFR weather over Dunoir, with fair to good visibility as far as Cody. However, VFR flight was not recommended because of the forecast.

The doctor commented that a snowstorm in the mountains at this time of year could last for days. He could see no harm in going as far as the Dunoir VOR to take a look. If the valley leading to Cody looked bad, he could always return to Jackson Hole. If he left at once he could complete the 100 mile flight before the light faded. At 3:33 p.m. he filed his flight plan and took off immediately. The air was fairly smooth and visibility was good as far as Dunoir. At 4:27 p.m. he reported over the VOR at 12,500 feet and stated he had begun a descent on the 060 radial. The Shoshone Valley appeared dusky in the distance, but he was experiencing no difficulty in maintaining VFR and he knew Cody was less than an hour away. The mountain peaks were heavy with snow and the *Tiger*'s outside air thermometer read minus 40° F. He turned the cabin heat up full. He noticed it did not seem to be putting out its normal warmth.

At 4:37 p.m. he radioed that he was at 8,000 feet and descending with the terrain, flying approximately 1,000 feet above ground, which was covered with snow. He reported some "light intermittent snow showers," and said he had a solid overcast at about 5,000 feet, but the valley ahead looked like it had better visibility.

The transmission was broken off abruptly at 4:42 p.m., and resumed at 4:45 p.m. At this point the pilot stated that his windshield had become completely coated with ice, and the wings appeared to be icing up. He said he had lost control and started to spin and had recovered after some loss of altitude. He could only see out of his side canopy. He was uncertain of his position relative to the terrain. He was attempting to maintain his altitude with a shallow turn, but was concerned about his proximity to the slope. At one point he thought he saw green and red lights on the ground.

The aircraft's transmissions now became progressively weaker. The FSS attempted to get a bearing on the aircraft with Direction Finding Equipment but were unable to do so. The last transmission was recorded at 4:58 p.m.

A statement from a witness on the ground, who was a pilot and owner of the airstrip and cattle feeding station at Skytop, indicated that he had heard an aircraft overhead at approximately 4:30 p.m. but had not paid any attention to it until he heard a sudden power surge and then saw the airplane begin to fly in a circle, when he realized the pilot was in trouble. He then pushed his own aircraft, a Cesna 180, out of the shed and turned on the navigation lights and rotating beacon, so the pilot would know someone was there. It was beginning to get dark, and snow was coming down. He stated:

I sent my boy with the tractor down to the airstrip, which is on a piece of benchland on the side of the mountain, and I told him to stay there with his CB on, and point the headlights straight down the runway. Then I turned the UNICOM radio on and kept transmitting until I picked up an answer, something like ". . . anyone down there?"

I told him this was Skytop, and who we were and that we had a landing strip he could use if he needed it, 2,600 feet lying 07–25, and not too much snow on it. He told me he was iced up pretty bad and couldn't see anything out of his windshield. He had the heater full on but it wasn't helping. He was flying in a circle, just barely holding altitude and he had seen my 180's nav light once or twice out of his side window, thought he was seeing things at first.

While he was talking I took my mike through the window and went outside and I could see him pretty close to the side of the mountain. I told him I could steer him toward the runway and all he'd have to do was watch his altitude and airspeed, and he said "Fine."

I told him to look for the tractor when he came in close and keep a couple of winglengths to the right, and he rogered that too.

Then I began to turn him so he could line up with the runway, but it was hard because he was maybe half a mile away, with some snow coming down and the light fading, and the threshold was about 200 yards from where I was standing, and I couldn't move any closer because of the microphone. I could see how high he was pretty well, but I couldn't tell where he was. But I could talk to my boy on the CB, and between the two of us we got him lined up for 07, which is really the only way to land because it is uphill on the open bench against the slope, and the mountain will stop you if you overshoot. But if you come in short you're in bad shape.

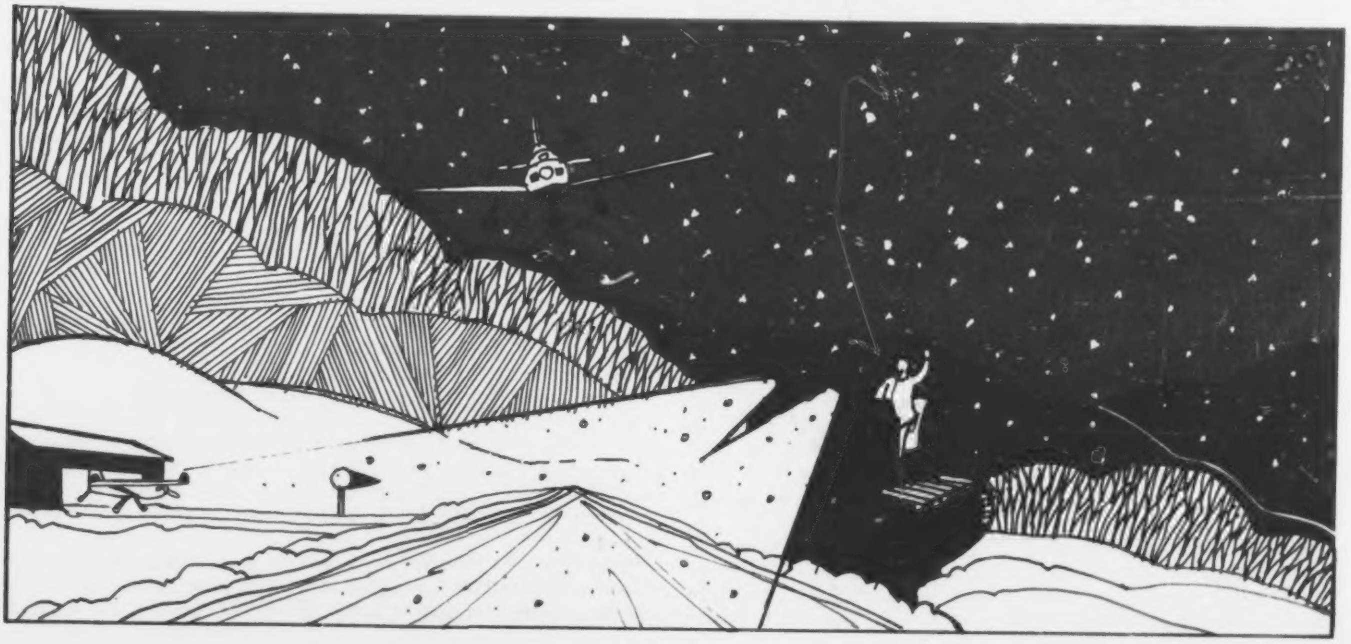
The pilot was worried because he couldn't see the tractor after we lined him up, but I kept telling him that was okay, the boy could see him, and he was talking to me. I told him to watch his instruments, keep his wings level and airspeed a little better than normal glide because of the ice, and just keep coming, not to pull off the power till he saw the boy, and not to pull up, because there wasn't light enough to go around even if he could make it with all that ice.

Then I saw him coming up on the tractor, with the boy waving like crazy and yelling at me Okay, Okay, he's got it. I told him to chop the power which he did and the airplane settled down and bounced a few times but rolled out okay up against the slope. My boy went over and got him in the tractor and brought him in. The pilot said it was zero-zero all the way; he'd been too busy holding steady to even try to look out the side at the end. He said he was a doctor, and he thought my boy's ears had got frost-bitten because he'd been waving his cap all the time, and he gave him some salve in case they hurt later. He looked pretty played out himself. He said he'd been ready to give up the ghost until he saw the nav lights on that old 180 of mine, and that was the prettiest Christmas ornament he ever hoped to see. He said we did a great job bringing him down, in fact he said it seemed like a real miracle.

Next morning we took him down to the valley where he could phone his family in Cody, and they drove up and got him.

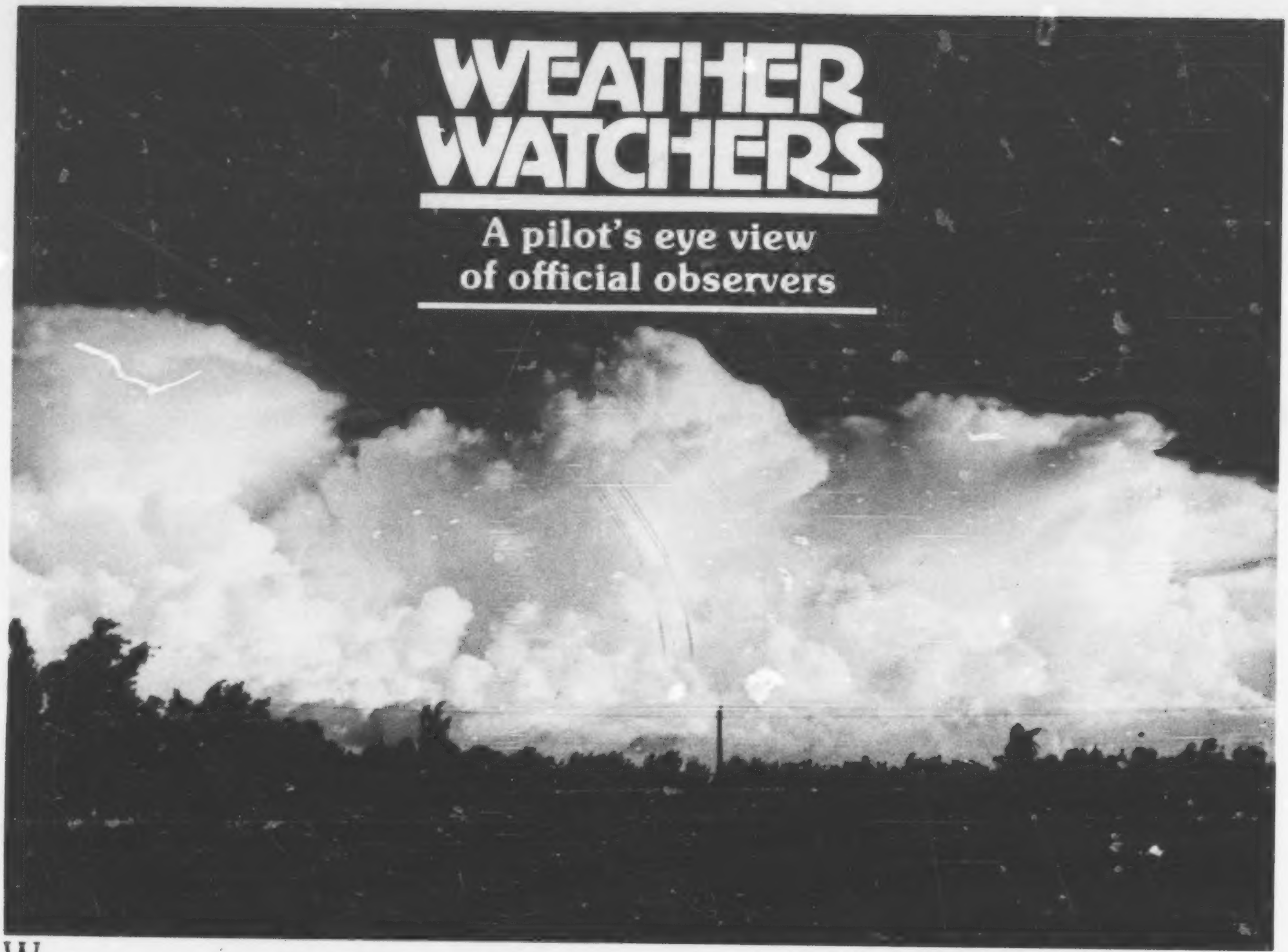
Clouds anywhere on the horizon are a bad omen at any time of year for the VFR pilot who is contemplating a night flight. Any unexpected or freakish change of weather can "pull the plug" on your source of visual reference. And miracle rescues are rare, even at Christmas. ■

Data for the accidents described in this article was drawn from reports of the National Transportation Safety Board. Certain details of the latter accident have been altered.



WEATHER WATCHERS

A pilot's eye view of official observers



Weather observing, as a traveler's aid, is an ancient skill dating back at least 35 centuries to Phoenicia in 1500 B.C. Even after all these years, it is still regarded as an inscrutable art or unfathomable science by many people, including some airmen. Perhaps this is because for many centuries reading the heavens, like reading the stars, was a secretive lore belonging only to seagoing pilots who enjoyed special honors (like Blackthorne in the novel *Shogun*). The dissemination of weather data over large land areas began only in 1653 when the Grand Duke of Tuscany set up 11 observing stations in northern Italy and central Europe. Contemporary inventions, like Galileo's thermometer and Toricelli's aneroid barometer, enabled observers to record temperature and air pressure as well as wind speed and direction and sky condition—essentially the same observations that are made today.

Speedy foot messengers or horsemen carried reports from the "Florentine Network" to market centers where travel conditions could affect the price of goods being traded. The accumulated data was compiled in the archives of the Academy of Experimentation in Florence.

A century later, Benjamin Franklin in the New World developed his own informal observation net, consisting of friends with whom he corresponded and shared notes on observed weather. The information he amassed, however, was only to satisfy his scientific curiosity. He could see no way to spread the information quickly enough for it to be useful to ordinary people. However, the invention of the telegraph in 1843 changed that situation radically.

With the aid of telegraph and radio communications, the network of weather observing stations has now grown to nearly 7,000 worldwide, with 1,300 civilian stations in the United States alone. All stations are linked by telephone, teletype, or computer to FAA flight service stations, which use the information for compiling hourly weather broadcasts and for pilot briefings. Eventually all weather information reaches the National Meteorological Center in Washington, DC and is incorporated into forecasts that are also derived from weather radar, satellite photography, and computers.

A weather *observer* differs from a *meteorologist* both in terms of experience and what he can do. A meteorologist, whose training takes years of specialized study, forecasts forthcoming weather patterns from the movement of fronts and high and low pressure areas. An observer, who is trained and certificated in one week,may take limited aviation weather observations and can only report what he sees.

Most of the approximately 11,000 certificated observers in the United States are employed either by the National Weather Service or FAA. Others make observations on contract with the Weather Service or work for a local air carrier. Private observers usually telephone or teletype (if so equipped) their observations to an FSS, although it is not a requirement. Contract stations are provided teletype equipment to ensure their information is available to pilots via the FSS.

An air carrier (Part 135 or 121) instrument approach can only be made when a certificated weather observer is based on the field. Part 91 (general aviation) instrument pilots can also avail themselves of the observation, either from an associated FSS or directly from the observer if they know how to contact that individual. (A Part 91 instrument approach to an airport without an official observer is *legal*, providing that a nearby altimeter setting is known.)

Even if there is no weather observer at a small uncontrolled airport, pilots can sometimes interpolate data by comparing observations for nearby airports. Knowing whether your destination airport has an observer is an important safety factor in planning a flight under changing weather conditions, which is most of the time.

Getting an idea of the weather at nearby airports is also a good yardstick for deciding whether or not to take off in marginal conditions. For example, a pilot could find himself above a cloud layer shortly after leaving the pattern and not be able to see the airport for a return landing if he should decide not to continue. Accidents have happened when pilots experienced minor mechanical problems after takeoff and were unable to land without penetrating clouds and losing control of the aircraft.

Since weather stations and flight service stations are all linked to each other via teletype or computer, it is easy for the briefer to "punch up" the weather observation for airports many miles from his location, and give the pilot precise en route data. On a long crosscountry, having the observations for numerous airports along the route could paint a meaningful picture of progressive weather movement.

The crux of modern weather observation is in its currency. Forecasts are valid for as long as 24 hours, but an observation for aviation purposes must have been taken within 15 minutes of the time it is made available to pilots for the first time and is valid for only one hour. The time of the observation is the time the last element (altimeter) is evaluated. Full time observers take hourly observations, but others, notably the Part 135 observer (only about 300 in the U.S. observation net), may take observations whenever it is necessary—when a company plane is due to arrive, for instance. This is not to say that if some other pilot knows the company frequency and calls in asking for the weather that the observer will refuse him. Although an observation taken by a private observer is essentially for a company's use only, it must be divulged on request of a flight service station or the Weather Service. It is also unlikely that the observer would withhold the information from a pilot who needs it.

The observation station itself may be a well-equipped flight service station, Weather Service office, small fixed-base operation with minimal equipment, or even a private home—literally anywhere the observer hangs his certificate. Weather observer training is available to pilots, mechanics, line boys, ticket agents, anyone at all who is sponsored by an operator or government agency. An eye examination similar to that given for a driver's license is required, in addition to class attendance for one week and successful completion of a final examination.

An observer may be a meteorologist as well, but when observing he cannot employ his forecasting ability; he can observe and report, nothing more. A tower-controlled airport that has no FSS or Weather Service tieline may have a qualified observer in the tower. A trained observer must make at least one official observation every 90 days to remain current. If not, the certificate is cancelled.

In most cases, the weather observing duties are part of the observer's regular occupation at the FSS or weather office, and he receives no extra compensation for it. Remuneration for the private observer has to be worked out between him and the aircraft operator who employs him.

Weather observations for surface aviation weather reports contain the same elements regardless of the observer who takes them. The place of the observation comes first, in the form of the station identifier, a three or four letter/number assigned to the airport or station. The time (Greenwich Mean) is recorded next; then comes the type of observation, either the hourly report surface aviation (SA), special (SP), or local (L).

The observed weather is given as follows: sky condition and ceiling, visibility, any significant precipitation or obstructions to vision, temperature in degrees F, dewpoint (if required), wind direction, wind speed in knots and character, altimeter, supplemental data explaining other elements, station pressure in millibars (if required), and sky cover. The observer then initials the report as his testament to its accuracy.

In a special column for remarks, the observer explains portions of the observation, and that explanation is also included in any transmission to pilots. For example, if the visibility is less than seven miles, the observer must report what has caused it: fog, rain showers, etc. The observer can also include in his remarks any information he feels pertinent to the observation, such as the amount of precipitation, the presence of ice on the runway, or the presence of certain types of significant clouds.

Special (SP) observations are taken at a time other than the normal observation period and under certain designated circumstances. Specials are made at the appearance of tornadoes, thunderstorms, funnel clouds, or water spouts, or whenever the observer feels a particular weather phenomenon or situation should be reported.

Local (L) observations are taken for an airport when its weather goes below the published minimums for an instrument takeoff. A local is always required as soon as possible after an aircraft accident at the airport or in the vicinity.

Here are some examples of surface aviation observations:

DCA 1300 SA CLR 7 56/49/2305/999

Translation: Washington National Airport, 0900 EDT, surface observation, sky clear, visibility seven, temperature 56, dew point 49, wind from 230 at five knots, altimeter 29.99.

DUL 2400 SA 50SCT M100BKN 8 63/52/2410/995

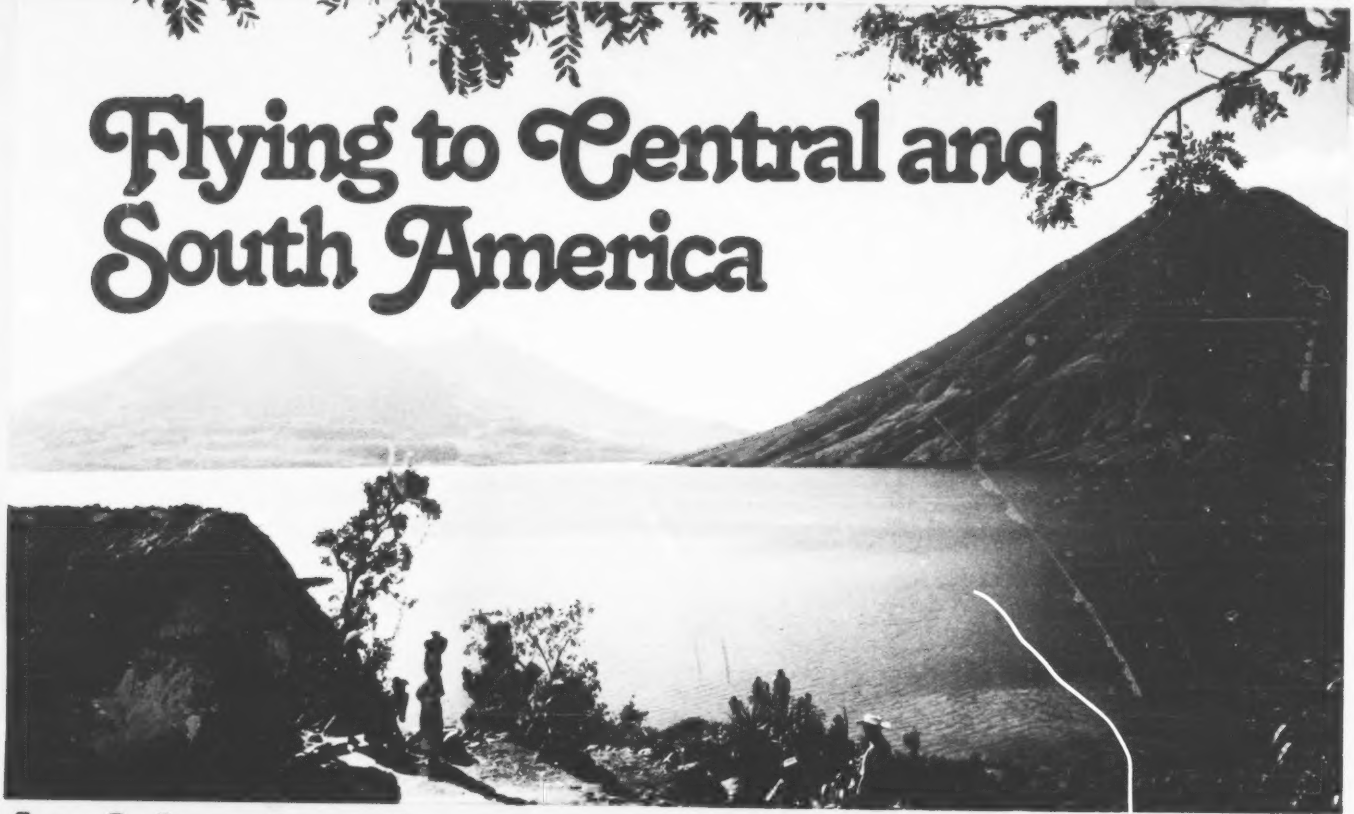
Translation: Washington Dulles Airport, 1800 EDT, surface observation, 5,000 scattered, measured 10,000 broken, visibility eight miles, temperature 63, dewpoint 52, wind from 240 at 10 knots, altimeter 29.95. ■

(A following article will discuss the manner in which observations are made and their significance to pilots.)

Sky cover as seen from the cockpit often appears very different from ground observation. Pilot between cloud layers may have good lateral visibility while the ground is completely hidden.

Photo courtesy Pan American World Airways.

Flying to Central and South America



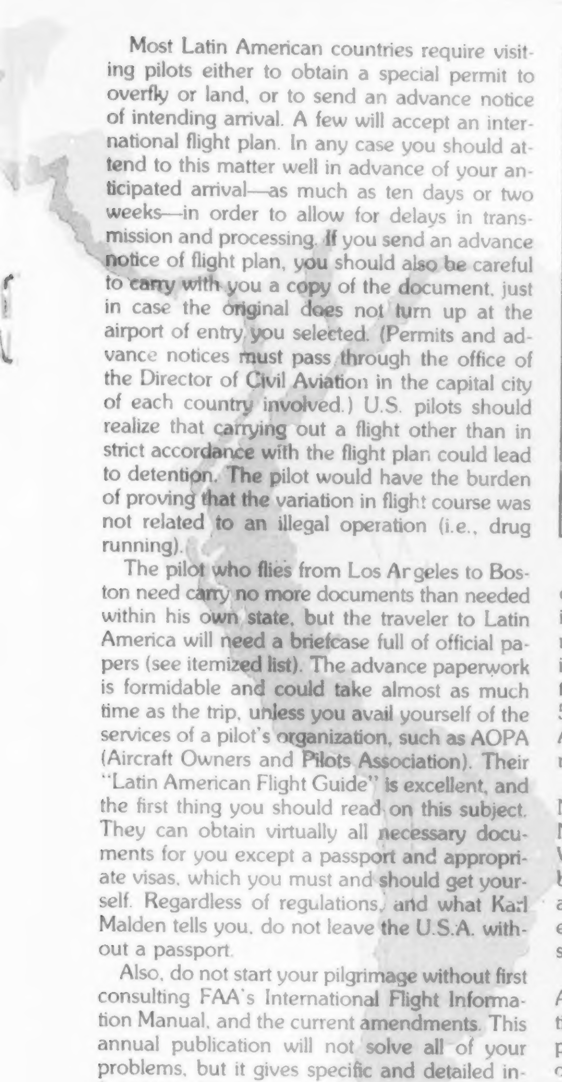
An Adventure in more than one sense of the word

The coming of winter signals an annual migration of hundreds of North American winged bipeds (genus aviators/aviatrices; species, general aviation) to Central and South America. They flock south in search of the sun, new horizons and airborne adventures. The storied mountains of the Yucatan and the Incas beckon. There is no lack of novelty and excitement south of the border, but some of the footloose pilots inevitably return to the U.S. in a mood closer to frustration than to fulfillment. The cause of their disenchantment can be expressed in three words—*lack of preparation*. The people of Latin America are, in the main, very friendly and their air safety regulations are based on our own. However, they *are* different nations, with different languages and many unfamiliar customs, habits, and rules which are not easily learned and complied with by a North American used to fast travelling and few delays.

The general aviation pilot, for example, who elects to fly across the United States from Los Angeles to Boston, a distance of some 3,000 miles, can reasonably expect to complete the journey within a week, allowing for about one day out of five on the ground due to poor weather. He can prepare for the trip with a few hours of flight planning, daily weather briefing and some inquiries en route. If that same pilot sets his eyes southward for a journey of similar distance, say from El Paso to Ecuador, with the same minimal planning, he is likely to be a month or more en route—and decide to return commercial. In traversing a dozen sovereign nations, instead of united states, he will have learned some important lessons on the following subjects:

- **Politics.** A state border may be of little consequence to an air traveller, but a *national* border can be as impenetrable as a brick wall extending to infinity. Landings or overflights without prior approval can lead to fines, confiscation, incarceration or other serious consequences. Bureaucratic red tape is never predicated on national significance, and may be in inverse proportion. The designated *airports of entry*, which must be your first touchdown point, are not always heavily staffed and officials may be difficult to find during a *siesta* or *fiesta* period.

Deviations from a flight plan may result in lengthy official inspections and delays on the ground. Common use of general aviation aircraft for drug smuggling makes them suspect by authorities.



Publications for Travelers Going Abroad.

1. **"International Flight Information Manual."** Published annually every September with three subsequent updates. Price, $9.00 for Superintendent of Documents, GPO, Washington, DC 20402.
2. **"International Notams."** Published biweekly, same address, price $38.00. Flight Service Stations near border crossings can be contacted for last minute International Notams; or you may contact the International Notam Office in FAA's Washington, headquarters. Phone: (202) 426-3390.
3. **Navigational charts.** Consult the "Catalog of Aeronautical Charts and Related Publications," available free from National Ocean Survey (NOS), Distribution Center (C–44), 650 Lafayette Ave., Riverdale, MD 20840. This includes names of local chart sellers.
4. **AOPA publications.** Free to members, sold to others. Especially helpful for southbound travelers are "Mexico," $7.50; "Central America," $3.50; "Latin America Flight Guide," $7.50. Write to AOPA, Flight Operations Dept., 7315 Wisconsin Ave., NW, Washington, DC 20014.

Most Latin American countries require visiting pilots either to obtain a special permit to overfly or land, or to send an advance notice of intending arrival. A few will accept an international flight plan. In any case you should attend to this matter well in advance of your anticipated arrival—as much as ten days or two weeks—in order to allow for delays in transmission and processing. If you send an advance notice of flight plan, you should also be careful to carry with you a copy of the document, just in case the original does not turn up at the airport of entry you selected. (Permits and advance notices must pass through the office of the Director of Civil Aviation in the capital city of each country involved.) U.S. pilots should realize that carrying out a flight other than in strict accordance with the flight plan could lead to detention. The pilot would have the burden of proving that the variation in flight course was not related to an illegal operation (i.e., drug running).

The pilot who flies from Los Angeles to Boston need carry no more documents than needed within his own state, but the traveler to Latin America will need a briefcase full of official papers (see itemized list). The advance paperwork is formidable and could take almost as much time as the trip, unless you avail yourself of the services of a pilot's organization, such as AOPA (Aircraft Owners and Pilots Association). Their "Latin American Flight Guide" is excellent, and the first thing you should read on this subject. They can obtain virtually all necessary documents for you except a passport and appropriate visas, which you must and should get yourself. Regardless of regulations, and what Karl Malden tells you, do not leave the U.S.A. without a passport.

Also, do not start your pilgrimage without first consulting FAA's International Flight Information Manual, and the current amendments. This annual publication will not solve all of your problems, but it gives specific and detailed information for getting into and out of foreign countries legally and safely. It is for sale for $9.00 (annual domestic subscription) from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Lack of required documents for flight in Latin America will not cause you any direct safety hazards, but it will certainly set up delays and may foul up your timetable to the point where you try to take some ill-advised shortcuts once you finally get airborne again. A good precaution is to crank in a 100 pecent reserve to the time you allot for the trip—and to the money you think you will need. *Patience is the key.*

•Navigation. If nothing else, a trip like this will cause you to love FAA and revere its network of VORs, flight service stations and en route radar coverage, which guides you from one end of the country to the other with the same dependable consistency. In Latin America the VORs begin to thin out as soon as you cross the Rio Grande, and once you are south of Mexico they are virtually non-existent, except at major cities. There are no friendly, free, flight service stations along the way. En route Centers may be contacted on 126.9 MHz, assuming you are high enough to have a line of sight bearing on the station. Radar coverage for civilian use is limited to major airports. The common en route NAVAID in Latin America for VFR flight is a nondirectional beacon, which operates in the low to medium frequency range (less than 50 MHz). For small aircraft operating VFR, an ADF receiver, which functions in this frequency range, is a must.

Some experience in navigating by means of NDBs prior to flying south is also desirable. NDBs are cheaper to install and maintain than VORs, and usually have a much better range, but they do not give you a direct bearing, they are difficult to track outbound, and they are easily distorted by thunderstorms and other sources of electrical disturbance.

For VFR flight you will need either the World Aeronautical Charts (WACs), or the Operational Navigational Charts (ONCs) which are progressively replacing them. WACs and ONCs cover twice the area of sectionals and consequently show less detail. This means fewer charts per flight, but calls for more careful scrutiny beforehand and places greater demands on your pilotage skills. Getting lost in a strange country can be an experience you will never forget, and never wish to repeat.

For IFR flying and for NAVAID frequencies (not given on WACs or ONCs), use the DOD Flight Information Publication (FLIP) charts, high and low altitude, and the en route supplement for the Caribbean and South America. These charts will also help the VFR pilot determine the type of NAVAIDs available.

•Terrain. In the United States a pilot can easily fly for 1,000 miles without encountering anything like a respectable mountain, but that is not true in Latin America. From the Rio Grande south to the Panama Canal, and all along the western coast of South America as far as Tierra Del Fuego, much of the terrain appears to be a continuing extension of north/south oriented mountain ranges. Elevations over 12,000 feet are not uncommon, and in Columbia and Ecuador the ONC states that maximum elevations are ". . . believed not to exceed 21,000 feet."

When you take into consideration that much of this land is close to the equator and you start estimating the density altitude of some of the inland routes and airports, you understand why aircraft service ceiling is an important factor here and why twin-engine or turbo-charged aircraft are preferred. Many of the fabled cities of Central and South America are situated within the protective walls of a mountain basin. Most of the year they are going to be beyond the reach of aircraft with ceilings under 18,000 feet, given the need for making allowances for safe clearance margins. Note: The WACs and ONCs give elevation in feet, but all of Latin America (including the controller who gives you your altimeter setting) uses the metric system, so have a conversion table handy and remember to use it.

•Weather. A glance at a map will show you that the ratio of water to land mass is much greater in Central America than in the United States. It follows naturally enough that there is more moisture in the air, and more days when the VFR pilot will have to wait out the weather on the ground than he is used to doing. In some of the banana belt countries there are periods when a daily rainshower or two is customary. The best flying weather (so-called "dry season") is found in the *winter* in Central America and in the summer in South America. (Since the seasons are reversed below the equator, the favorable season is essentially the same four calendar months—December through March).

Remember, wind direction around highs and lows will be reversed after you cross the equator. Anticipate storm movement accordingly.

Normally if you are flying in the lower elevations along the coast you can count on the best weather of the day occurring before noon. In the mountains, however, the passes may become plugged with clouds for days on end. Again, patience is the key. Wait it out. Write some postcards. Clean out the airplane. The air traffic control resources for assisting pilots trapped by weather simply do not compare with those in the United States. Even if you survive a crash landing, it could be many days before anyone finds you—or even misses you.

Weather briefing facilities, likewise, are limited to major airports, and even here the fore-

Excerpts from AOPA's International Checklist.

Personal Documents

- a. Passport
- b. Visa
- c. Tourist card
- d. Other proof of citizenship (i.e., birth certificate)
- e. Airman certificate
- f. Medical certificate
- g. Radio-telephone operator's permit
- h. International certificates of vaccination

Aircraft Documents

- a. Logbooks (aircraft and engine)
- b. Registration certificate (type weight in kilos on front)
- c. Airworthiness certificate
- d. Flight manual
- e. Flight authorization letter (if you are not owner of aircraft)
- f. Landing and overflight permits
  - 1. Military bases
  - 2. Foreign countries
- g. Insurance policy (including foreign liability)
- h. Maintenance data
- i. Aircraft radio station license
- j. Contract for ground services from international carriers

Inspection Services

- a. Customs information for all countries on itinerary
- b. General declaration forms
- c. Passenger manifest
- d. Aerosol bomb (cabins must be sprayed with insecticides before landing, in some circumstances)

Operational

- a. FAA International Flight Information Manual
- b. WAC, ONC, FLIP Charts
- c. VOR, ELT, HF/ADF radios

Maintenance

- a. Fuel—international credit cards
- b. Spare parts for engines and airframe
- c. Manufacturer's list of repair stations abroad for airframe, engines, avionics equipment, etc.
- d. Methanol SpG kit

Survival Gear

- a. First Aid kit
- b. Survival kit
- c. Flotation gear

Miscellaneous

- a. ICAO international flight plan forms
- b. Commissary supplies (include bottled water)
- c. Duplicate keys for aircraft, galley, bar, luggage, etc.
- d. Fuel strainer
- e. Personal
  - 1. Adaptors for electric appliances
  - 2. Credit cards
  - 3. International driver's license
  - 4. Airline credit cards
  - 5. Letter of credit from bank
  - 6. Six or more passport size photos
  - 7. Travelers' checks
  - 8. Ground transportation information
  - 9. Supply U.S. cash—small denominations
  - 10. World-wide currency converter

casts or observations (which carry a service charge) may not be up to date—some may be several days old, in fact. Many pilots prefer to seek weather information from U.S. flag carrier offices or from fellow pilots in transit. There is no source of en route weather except for the air traffic centers, which are often difficult to contact. What it boils down to is that the pilot must keep a sharp eye about him aloft at all times, relying heavily on his own judgment. He should also ground himself at the first indication of bad weather. Single-pilot or single-engine IFR is not advised at any time. Be patient. Wait it out. Remember *mañana*.

•**Fuel**. There is plenty of it around down there, but it may not always be available where you are and when you want it. (In some areas fuel supplies are controlled in order to combat drug flying.) Never land with dry tanks when you can avoid it. When refueling, always monitor the operation. Make certain a suitable filter is in use and provide your own teflon strainer net when in doubt. Top your tanks always, regardless of the price. Tiptanks could make your trip a lot easier. Otherwise, keep about twice the reserve you customarily do. You might also want to carry a few cans of correct oil for your engine.

•**Language**. A smattering of high school Spanish may help you in a restaurant or shop, but not with air-to-ground radio work. Unless you are virtually bi-lingual, stick to English whenever you can in radio transmissions. When you need precise guidance the last thing you want is rapid-fire "controllerese" in a strange dialect. Keep trying in English until they find someone who can talk to you or practice your Spanish beforehand.

Incidentally, since most U.S. pilots headed for Central America and points south will have to overfly or land in Mexico, (which is technically in North America) you will want to be updated on the latest requirements for that country as well. A recently issued pamphlet on flights to Mexico, including the latest requirements for local liability insurance, is available form FAA flight service stations and GADOs in the southwestern states.

There are also some regulatory differences governing flight operations in Central America which differ significantly from U.S. rules:

- A multi-engine aircraft is required for IFR flights.
- No single-engine night flights are permitted.
- A pilot must be IFR rated to night file in a multi-engine aircraft.
- Whether IFR or VFR, a flight plan must be filed, except between uncontrolled airports.

For the rest, the flight and traffic rules are generally the same.

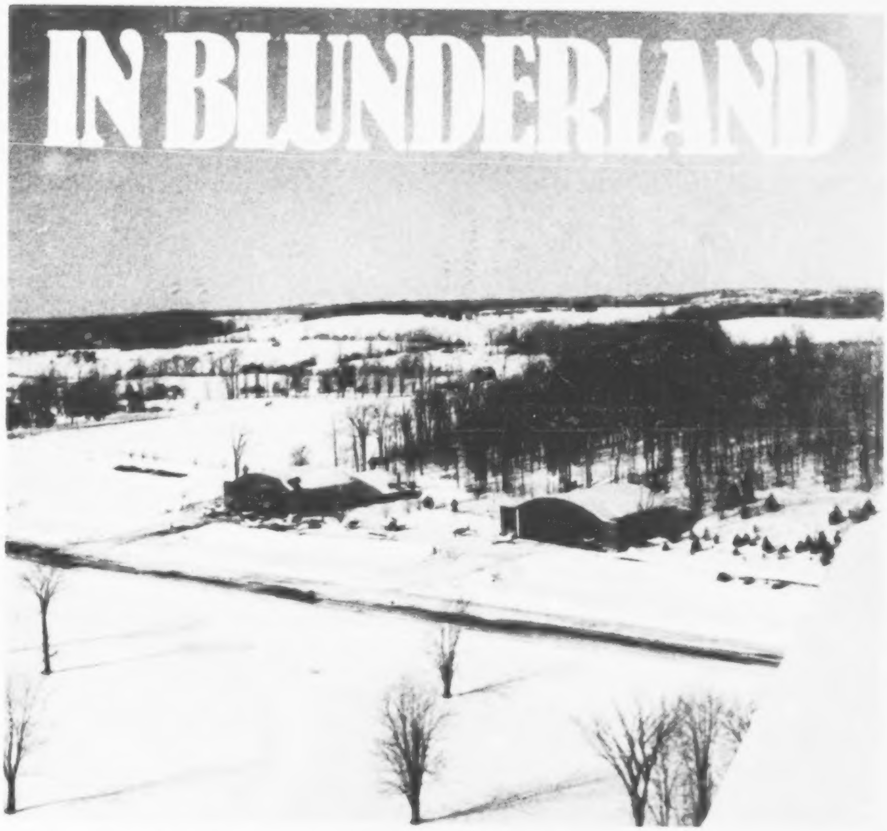
The idea of traveling by private plane as a tourist in Central or South America may have taken on a whole new appearance at this point, but these cautions are not meant to be discouraging. The trip *can* be made safely and interestingly by any proficient pilot who is willing to make the necessary preparations and has the patience to wait out any difficulties or delays he encounters.

You don't have to be a saint, but it helps. ■

Fueling at small airports in Latin America is usually done directly from cans or fuel drums that may be contaminated. Pilots should be prepared to supply filters and supervise the operation.

ALICE IN BLUNDERLAND

The Continuing Saga of a Determined Young Woman at Bay in the Flight Training Environment



Deliverance Day: On my own at last. Since making my first solo I have felt as if I were practically reborn, a winged creature scarcely related to poor earthbound mortals. I've shed my image as "that girl student"—at least it seems so when my instructor, Tim, invites me to hangar flying sessions with instructors and other pilots. That really makes me feel like one of the guys. After two more supervised solos Tim signs me off to leave the airport for the practice area. He's such a great guy, but how glorious to be flying alone without a six-foot four-inch sober-faced critic alongside. Forgive me, Tim.

8-20-80. Finally I get to go to another airport. This is a dual crosscountry from our little Dogpatch Airport at the back door of Washington National, about 65 nautical miles to Rappahannock Municipal, across the lower Potomac. I planned and replanned the flight until I was sure I could do it blindfolded, and I was bubbling with excitement when we took off. Beautiful clear weather, too. Tim managed to burst the first bubble when we got to checkpoint number 1, an intersection of two country roads. "How do you know, young lady," he says, "this is your intersection? Could be a dozen intersections like this around here."

I argued it's the right distance and direction and the right kind of roads, but he shakes his head. "Not good enough. You need a corroborating landmark for positive identification—racetrack, pond, tower, something. Miss your first checkpoint and you may never find any of the others."

Yes, sir. Eagerly I point out to him the dragstrip adjoining my next intersection. Tim does not look impressed. "Little dirt playpen like that could spring up anywhere overnight," he says. "Like to see something more permanent."

Like a cemetery, maybe? Or a pyramid? But I keep these little thoughts to myself. We fly on. My winged image is fading as I prepare to fend off the next barb.

We are to cross the Potomac at Colton, a tiny roads-end village at the end of the peninsula. No way I could miss it, but Tim is scowling one of his deacon scowls. Every spit of land along the river here has some kind of road leading out to a couple of buildings on the shore, he opines. How do I know, *for sure*, this is Colton?

For sure. Well, I don't.

"I do," he says. "See the monument—that big white cross on the island out there off shore?"

I see it.

"Obvious checkpoint. That's where they bless the fishing fleet every year, when the season starts. Didn't you know about that?"

I knew. I know also he was going to ask me why I didn't use it to confirm Colton, so after some fast thinking I explained that the monument had too many unhappy memories for me. My father was blessed there just before he went on his last voyage, and was strangled by a giant squid. A stare of disbelief, but we fly on in silence over the river.

About halfway across Tim pulled the throttle and announced an engine failure. *Where am I going to put it down?*

I pointed out a green field straight ahead on the opposite shore.

"How far?"

I guessed about three miles. He measured it on the chart and again put on his deacon scowl.

"Windspeed and direction?"

"Well, at our airport it was—"

"Never mind that, we're 50 miles away. Did you check the winds aloft for the lower Potomac and Chesapeake Bay?"

Nope. (Pause) *I didn't think it was necessary.*

"You must be a great swimmer."

"Nope. I don't swim."

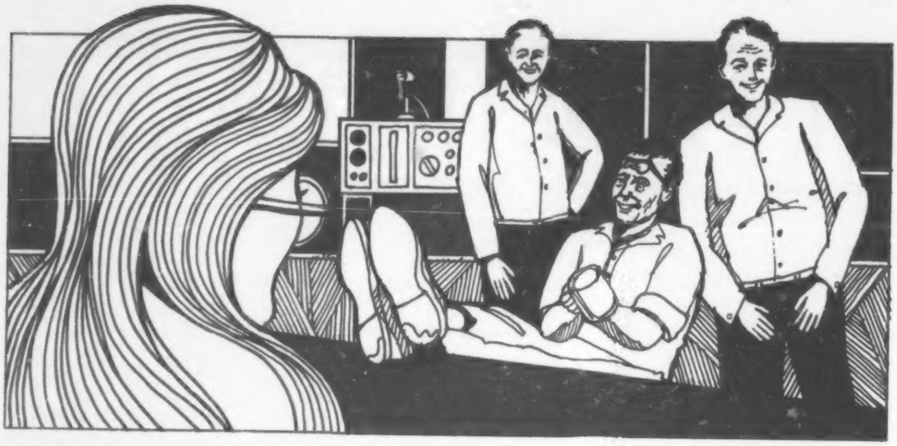
"Not at all?"

"Not a stroke." For some reason Tim found it hard to swallow this piece of information and kept chewing on it and tossing it up like a dog with an old bone. He couldn't understand how anyone in these times wouldn't learn how to swim. *Was there some kind of problem?* I explained to him, sadly, that my skin was perforated with hundreds of tiny holes, which let water in.

That got him quickly back to the subject of winds, and he gave me a short lesson in estimating direction and speed from Natural and Unnatural Phenomena. Then he got out his calculator and started putting it all together. *Now let's see, the glide ratio for this airplane is ?*

"*—is something you forgot to teach me.*"

"It's in the books. About six to one, for this ship." He showed me his figures and asked me if we were going to glide to shore. As far as I could tell, while watching the water nervously



with one eye, we were going to get wet. Tim nodded and pushed in the power.

"Being such a great non-swimmer, I suppose you made sure we had flotation gear on board?"

"Not required."

"Neither is breathing, for that matter, but it's well recommended."

I reached behind and handed him a vest. I told him he could stick his head in it right now, but I was planning to go down with the ship. That loosened things up for a while, and none too soon, as the nice green field I had selected turned out to be a water treatment plant.

Rappahannock came into view right on schedule and I called in on the UNICOM for local information. I called again, and again, and again—no answer. I flew over the airfield and spotted what was left of the windsock, not more than a couple square inches. The runway was supposed to be a good 3,600 feet, but I was nervous about landing downwind, so I looked about for Natural and Unnatural Phenomena and had to settle for some underwear on a clothesline. I put out a couple of broadcasts in the blind about my intentions and set the airplane down. No problem.

Tim introduced me to the airport manager, who was sitting with some cronies in the coffee shop, his feet up on the counter. He gave me a big smile and said, in a good old boy voice I loathed, "Was that you a-hollerin' on the radio, honey? Seemed like you was landing and taking off all at once."

"Something wrong with your transmitter?"

"Just happened to be out of reach." (It was about ten feet away.) He gave me a big wink. "Shoot, honey, if I'da knowed you was in trouble I'da jumped up like fat off a hot pan."

"You are most kind."

Tim eased me over to a telephone and suggested I file for the return trip. I heard him telling the others something terribly humorous about his not wanting female pilots to file round-robin because they might wander off or fall in love and forget to cancel. Big laugh, slapping of thighs. "I'm available," a couple of them bawl out. I march out the door.

We were at least ten miles out of there before I bothered to turn the radio on, and another ten miles before I could settle down and fly the airplane without muttering under my breath. Tim made no comment. He just sat there looking out the window and whistling occasionally. I had no trouble finding all of my checkpoints on the way back to our home base and really enjoyed hearing that friendly familiar voice on the UNICOM. No wisecracks, no jive, just a straight-to-the point report and a cordial welcome. I made one of my better landings and taxied smartly up to the ramp, shut down the airplane and turned to Tim for the usual post-flight commentary. Not a word. He just smiled, got out of the airplane and ambled back to the flight office.

I waylaid him later at his desk where he was going over his flight log. "Well," I said, "how did I do?"

He studied his notes. "We got there all right. And we got back."

Had I made any mistakes?

"You notice anything?" he asked me.

I thought for a moment, shrugged and shook my head. From the smile on his face I knew that wasn't the right answer. He crossed his long legs on the desk, leaned back and studied me.

"You're a smart girl, and educated, and you read the books and study the charts and you fly real well and you're real eager—maybe that's the problem. You're so darn eager to be a Perfect Pilot that you can't imagine yourself making mistakes. But from here on out, most of what you have to learn to become a really fine pilot is going to come from the mistakes you make, and acknowledge, and correct—not from the books or instructors like me. I'm sitting here trying to figure out if you really did learn anything from the flight. If you can't think of any mistakes I don't see how you learned a thing."

Okay, I told him. I didn't have a positive identification for my first check point. I suppose I could have been mistaken about Colton too, though I wasn't, was I? And I didn't get off course ever.

"Not this time. Another time you might, unless you improve your technique. There's always some unknowns in flying, so the more things you are sure about the better off you are. Now I know you don't like me checking you off all the time, so you've got to start doing it for yourself."

Okay. I confessed to not having measured the river crossing or learned the glide ratio of the airplane or checked the winds aloft en route. I even admitted to having ignored the monument as a crossing point. Another time I would correct all those goofs. *Okay. Are we ready to talk about the next flight?*

"Not quite. How about Operation Deep Freeze?"

I didn't know what he was talking about.

"The catty little sulk at the airport, and the radio silence when we left. How much did that do for the safety of our flight?"

I conceded it didn't help, but I couldn't see it did any harm either, since that amorous slug in the coffee shop wasn't going to bother transmitting on the UNICOM.

"You don't know. I think he would have called us, if there was something we needed to know. I've known him a while. He's not a dummy."

He could have fooled me. Why he didn't answer when I was setting up to land?

"Runway was clear, wind was calm, visibility unlimited, coffee was hot—what did he have to tell you? Not to be nervous because its your first landing away from home? How did he know that? You want special treatment, you have to ask for it."

I didn't want special treatment, I told Tim, my teeth still gritting at the memory, *just a little common courtesy.*

"Well, may be all he wanted was a little common friendliness. Seems to me the two of you could have got together all right. He doesn't owe you anything, you know. You didn't even buy a cup of coffee there."

I told him I didn't see the poorbox or I would have chipped in.

"Not funny. These people aren't paid a fancy salary to keep you flying right. They're busy trying to earn a living or do a job, and minding the UNICOM is something they do in their spare time and in their own way. There are hundreds, maybe thousands of people like that in little airports all over the country. Short-hoppers like you couldn't get along without them. You're going to be living with them for a while, and learning from them, so you better get used to the idea."

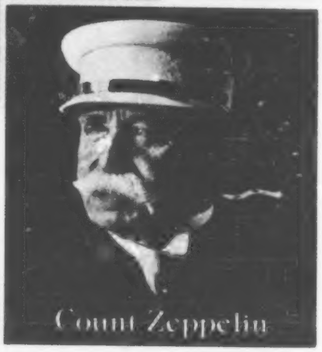
Tim stood up and shuffled through his flight log. "I don't suppose," he said, "there's any way you'd go back to Rappahannack solo?"

In a lead casket, was my reaction. But I knew he had me stonewalled, so I lowered my eyelids meekly and said I'd go. *Yes sir, I'd love to go. That fat friend of yours there will try his humor on me, and I will puke on him, but I will go.*

9–24–80. First solo cross country. *Sixty-five miles to Rappahannock Municipal and return. Departed 9:21 local, continued en route via Colton. Observed loss of power while crossing Potomac River. Determined cause was throttle friction lock not tightened down. Remainder of flight uneventful. UNICOM at Rappahannack reported potholes near threshold of Runway 07, recommended landing 25. Complied. No problems. Remained on ground 20 minutes. Airport manager signed logbook. Departed Rappahannack 10:34 local. Returned by way of Brooke VOR, uneventful. Landed 11:35.*

Remarks: Manager said he did not remember me. ■

THE BIGGEST AIRCRAFT OF ALL TIME



Count Zeppelin

What does a man do when after 32 years of military service he is suddenly retired and told to go fly a balloon? One man did just that, and eventually produced an airship almost as long as three football fields.

His name was Count Ferdinand Adolph August Heinrich von Zeppelin. He was born in Wurttemberg on July 8, 1838, descending from a long line of German aristocrats and military adventurers.

Young Ferdinand received the upbringing typical of central European nobility, learning the management of the family estate and attending Wurttemberg Military Academy and the University of Tubingen, where he studied political science, chemistry, and engineering. Then he dutifully followed family tradition and joined the Army.

In 1863 Europe was experiencing an unusual occurrence—peace. The nearest war of any consequence was the War Between the States, so Count Ferdinand got himself dispatched to Washington, DC as an official observer.

The King of Wurttemberg provided him with letters of introduction, leading to a chat with President Lincoln, who gave the Count a military pass so that he could move freely among the Union troops. Count Ferdinand also secretly carried a letter to General Lee, just in case of capture by the Confederates. He almost had to use it at Ashby's Gap in the Shenandoah Valley, when he became involved in a cavalry skirmish with J.E.B. Stuart's troops. All that saved him was the speed of his horse.

During the summer of 1863, the restless Ferdinand decided to see more of the United States before he returned home. With two Russian fur traders and a pair of half-breed Indian guides, he set off on a wild west trek which ended in St. Paul, Minn. Here Ferdinand met Professor John Steiner, a former balloonist with the Union Army.

Steiner had designed an odd cigar-shaped balloon with a rudder to give it more directional control. Ferdinand made on ascent, and was immediately captivated by a passion for flight. Although he was obliged to return to Wurttemberg and resume his army career, he maintained an active interest in ballooning for the next 25 years. He resigned his commission in 1891 and immediately planned the constructionof *Luftshiff* (Airship) *Zeppelin* No. 1 (LZ–1).

Airships, or steerable, power-driven balloons, had already been flown in France but were considered little more than toys for the wealthy, since they were structurally fragile and carried a very small load.

The practical German proposed to use the new aluminum alloys in a strong metal framework that would support unlimited containerized gas envelopes. After launching three early models of his *Luftshiff* with varying degrees of success, over a ten year period, Count Zeppelin startled the world in 1901 with his LZ–4, an enormous 446 foot "dirigible."

Sustained by over a half million cubic feet of hydrogen gas, LZ–4 had a useful load of 10,150 lbs. Two 210 hp Daimler engines achieved an airspeed of 30 mph. Steering fins were attached fore and aft, controlled by the crew in the gondola amidships. Significantly, a small platform supported a machinegun.

To pay for the construction of this huge ship, Count Zeppelin spent nearly his entire fortune, mortaged his wife's estates in Latvia, dismissed his servants, borrowed from all of his friends and operated two national lotteries. But the LZ–4's very first flight, one June 20, 1908, was such an astonishing success that the future of his Zeppelin Company was assured. Even though the airship caught fire and burned three months later, the Count quickly received voluntary donations of over $1.5 million to continue his work, which appeared to offer Germany a striking military advantage.

Before World War I was over the Zeppelin Company had built more than 100 huge airships, some over 800 feet long and capable of supporting 100,000 lb. loads. As night bombers they terrorized the Allied cities, hunting in large packs at altitudes above the service ceiling of early pursuit planes, raining unparalleled destruction on civilian populations without warning.

In the last year of the war, higher performance Allied airplanes were finally able to outclimb the Zeppelins, and the slow speeds and huge surfaces of the latter made them an east target for incendiary bullets. Giant airship after airship was sent down in flames. Bad weather, mechanical problems and sabotage also took their toll. Some 82 Zeppelins were lost in four years of warfare.

Count Zeppelin died in 1917, but his dream of "floating pleasure palaces" was reborn a dozen years later, when Germany introduced world-wide air service with civilian airships. The "Super Zeppelin" was 806 feet long and 135 feet in diameter, buoyed with seven million cu. ft. of hydrogen gas, had a useful load of nearly ¼ million lbs., and an airspeed of 80 mph.

Furthermore, the *Hindenberg* in 1937 offered a luxury and spaciousness never equaled in air travel. Fifty passengers were accommodated in twin sleeping cabins with hot and cold running water. An "upper deck" observation room measured 49 × 92 feet. There was also a formal dining room, a lounge, and writing and smoking rooms.

In addition to round-the-world service the Zeppelin took passengers on leisurely pleasure cruises, where the wonders of man and nature—the Swiss Alps, the Greek temples, the shrines of Jerusalem, the pyramids of Egypt, etc—could be viewed while floating gently through the sky in apparent perfect safety.

That illusion was shattered when the *Hindenberg* caught fire and crashed, killing 35 persons at Lakehurst, N.J. on May 5, 1937. Although a sister ship was already under construction, it was dismantled in 1940, as public confidence shifted to the new generation of fast transcontinental airplanes. The American military dirigible program was abandoned shortly after the 785 foot *Macon* broke up in turbulence, in 1935.

Since World War II many proposals have been made to resurrect international dirigible flights, on the grounds of comfort and economy. But most aviation experts agree that the "elongated balloons" will never be as safe or maneuverable as airplanes, and the only enduring vestige of Count Zeppelin's grandiose dream we will see in the sky is the Goodyear blimp. ■

UPPER CRUST. Frozen snow adhering to wing or tail surfaces is a frequent cause of winter accidents and unhappy holidays. Propwash on the takeoff roll will not always blow all snow off, and what is left behind can disrupt airflow over the lifting surfaces or jam control cables for the ailerons or elevator. Make certain *all* snow is removed from the airplane before takeoff for a happy holiday.

Boy's Flying Camp Operator Given National Award

The founder of a live-in flight school for teenagers, and a maintenance supervisor who is not afraid of getting his hands dirty were the most recent recipients of the annual Flight Instructor and Maintenance Technician of the Year Awards.

In 1968 Lee G. Barnes, then a high school music teacher with a background in Navy flying, started taking scholastically unmotivated youths up flying on weekends. Flying proved such a healthy stimulation that Sky-Life was born—an airport "camp" for teenagers interested in the challenge of aviation.

Over the past 13 years with Barnes' help, some 2,000 youths have learned about flying by doing it—with only one minor mishap.

Having to remove the propeller in order to perform engine maintenance on the Grumman American *Tiger* seemed a laborious process to Michael E. Brown, 34, of Prescott, Az.—and a possible cause of frequent propeller stress failures from over-torquing. So the maintenance supervisor rolled up his sleeves and worked out a cowling arrangement that provided immediate access to the powerplant, resulting in safer maintenance on the *Tiger*.

Barnes and Brown received a three-day holiday in Washington, DC in October plus numerous honors and cash awards totaling several thousand dollars at a ceremony made possible by aviation manufacturers and associations.

Time in Service Limitations for Engines, Propellers

Revisions to airworthiness Federal Aviation Regulations will improve maintenance safety standards for future aircraft by requiring manufacturers to provide more explicit "Instructions for Continued Airworthiness" for aircraft engines and propellers. Manuals will contain specific details on proper maintenance procedures and an Airworthiness Limitations section that sets forth mandatory replacement times, inspection intervals, and recommended overhaul times.

The revisions govern aircraft built under new production certificates issued after October 14, 1980.

In a related action affecting general aviation, FAR Part 91 was amended to require that ". . . no person may operate an aircraft for which a manufacturer's maintenance manual or Instructions for Continued Airworthiness has been issued that contains an Airworthiness Limitations section unless the mandatory replacement times, inspection intervals and related procedures . . . have been complied with."

Furthermore, the aircraft owner or operator must make certain that maintenance personnel not only record work performed in maintenance logs but also the time in service of each engine and propeller, as well as the airframe.

Details of the rule changes were published in the September 11, 1980 *Federal Register*, Vol. 45, No. 178, and are available for $1.00 from the Superintendent of Documents, Government Printing Office, Washington, DC, 20402.

Certificate Format Changed

The new look in FAA pilot certificates is a smaller, credit card size form in blue, gold or white, with the present distinguishing seals eliminated.

A blue certificate will be issued to either private or commercial pilot certificate holders who have received some instrument training. A gold certificate will be issued to flight instructors who have trained at least 10 applicants for a certificate or rating, of whom 80% have passed the flight test on the first attempt. White certificates will be issued to all other pilots.

There is no plan to reissue existing certificates in the new colors.

Operating and Airworthiness Standards for Large Airplanes

A higher safety standard has been established for large airplanes with the enactment of new FAR Part 125, governing general aviation airplanes that carry 20 or more passengers or have a payload of 6,000 pounds or more. U.S. registered airplanes not used as air carriers or in agricultural operations are affected.

The new rule will require *chartered* airplanes of this configuration to be maintained and operated under standards approaching those of common air carriers, beginning February 1, 1981.

Air travel clubs who use similar airplanes may continue to operate under Part 123 until January 1, 1983, when they too must conform to Part 125. Interstate commercial operators will also have to comply with Part 125 on the same date.

Part 125 requires operators to provide effective safety management and to set duty times for flight crews; maintain flight operations and maintenance manuals; keep and follow minimum equipment lists for each airplane; and install airborne weather radar as required equipment in each airplane. The rule, which is designed to close certain legal loopholes in the existing regulations, was enacted after 12 months of public comment and discussion.

Latest Airmen Publications

Aeronautics

The 1971 "Pilot's Handbook of Aeronautical Knowledge," FAA's basic training and reference manual for general aviation pilots, has been replaced with an expanded and modernized edition. The new handbook reflects many changes in regulations, flight procedures, and aircraft which have taken place in the last ten years.

Notably the chapter on aircraft performance has been enlarged to include detailed discussion of data provided in Aircraft Flight Manuals and operating handbooks. Complete sections on weather and navigation are included.

The 1980 handbook is available for $11.00 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Ask for FAA Advisory Circular 61.23B.

Flight Training

An updated "List of Certificated Pilot Schools" is available free from DOT Publications Section, M443.1, Washington, DC, 20590. The state-by-state listing gives the school's complete address and type of training given. Write for Advisory Circular 140–2N

Exam-O-Grams

The 1980 Exam-o-grams are now available at a cost of $13.00 for the combined VFR/IFR set. Exam-o-grams are a compilation, with illustrations, of answers to questions which have caused pilot applicants the most difficulty on written examinations. The book is updated to accommodate recent rule changes. Send a check to Superintendent of Documents, Government Printing Office, Washington, DC, 20402.

• Dual PIC

Please help me clarify a dispute. I would like to log my instrument instruction time as pilot in command time. FAR 61.51 tells me to go ahead, but my flight instructor tells me I cannot. Who is right?

M. Patterson
Baltimore, MD

You are. FAR 61.51(c)(2)(i) and (iii) permits the pilot (private or higher) receiving the instruction and the flight instructor to log pilot-in-command time for the period of instruction.

• Non-Chauvinist Male CFI

I would like to say I think your magazine is excellent, and I thought the article "Alice in Neanderthal Land" was more than excellent. I am a female student pilot, and the descriptions about Alice's run-ins with different schools and instructors are almost a carbon copy of mine. I think that it is sad that women are accepted into aviation only as a novelty. I am just as dedicated and serious about aviation and the entire concept of learning to fly as any male student, perhaps even more so. My instructor is one such as Alice talked about. He takes quite a bit of harrassment about my being female. Nevertheless, he is very patient and extremely thorough. His never-ending encouragement and support is overwhelming.

So let's hear it for the unbiased instructors; there just aren't enough of you!

Lynda Guenther
Dayton, OH

• Spatial Disorientation at Sea

As a resident of Hawaii, I read your July/August 1980 article on gear-down ditchings with interest. Before reading of Toby Alvis' successful ditching in a Cessna 185, I adhered to the conventional belief that fixed gear would "trip" the plane on landing, resulting in a flip, and, if fortunate, an upside down escape from a flooding cockpit. Although it raises the eyebrows of my macho flying compatriots, I invariably wear and insist that my passengers were life preservers on over-water, single-engine flights.

I'd like to point out another factor in Toby's survival. He stated that he ". . . lined up with the swells and aimed the nose at a half-way point between the life boat and the freighter." These floating objects undoubtedly allowed him to overcome the severe spatial disorientation that is characteristic of open sea landings. Without the presence of objects of recognizable scale, it is difficult, if not impossible, to accurately judge one's height above the water. During my years as an Air Force recovery pilot, we dropped smoke cannisters and used the foam of breaking waves to help overcome this problem.

Byron M. Fox
Captain Cook, Hi.

In the absence of any visual aids like smoke or ships, the Airman's Information Manual has the following recommendation in Paragraph 464 F(1): "If no power is available [to drag the surface] a greater than normal approach speed should be used down to the flareout. This speed margin will allow the glide to be broken early and more gradually, thereby giving the pilot time to feel for the surface—decreasing the possibility of stalling high or flying into the water."

• New Effective Date for Seatbelts

In the "Briefs" section of your March/April 1980 issue you state that metal-to-metal latching seatbelts are required as of December 4, 1980 on all standard category certificated U.S. aircraft. I have just read from another source that the date is actually December 4, 1981. Who is correct?

William F. Kardas
Glassboro, NJ

Shortly after the December 1980 date appeared in the March/April "Briefs" the effective date was extended to December 1981.

• Part 1351, Where Are You?

The answer to "Discouraged Pilot" in the "Forum" for September/October 1980 mentions FAR Part 1351.105. I looked everywhere, and I couldn't find a Part 1351 anywhere. What is it?

Leo Gerard
Lancaster, Pa.

Part 1351 was enacted when one too many "ones" was typeset. The correct reading is Part 135.105.

• Weather and Alternate Airports

What consideration should I give to weather forecasts which contain such words as "chance of," "briefly," and "occasionally" when filing an IFR destination or alternate?

Gary L. Larsen
Honolulu, HI

"Occasionally" is used in aviation weather forecasts to denote frequent changes in the weather picture for short periods of time, e.g., "occasional light showers." Forecasts are used for deciding the alternate to be listed in an instrument flight plan or if the alternate selected is suitable. An alternate with possibilities of below minimums weather, as indicated by words such as "chance of," "briefly," and "occasionally" in the forecast, would not be an appropriate alternate.

• Mini Survival Kit

I appreciated the fine article in the November/December 1979 issue about post-crash survival. Now that winter is upon us again, my question is "Where can you purchase the materials in the mini-survival kit?"

Carl H. Garrison
Coffeyville, Ks.

The materials for the mini-survival kit are pictured in the article on page 10 and consist of objects usually found around the house. If not, most supermarkets or drug stores or both will be able to supply the materials.

• Crash of the Month?

As always, I was delighted to see *General Aviation News* (or "Crash of the Month" as I sometimes call it) awaiting me in the pile of the day's mail. As usual, it was filled with good articles, written in language as simple as a complex subject will permit.

This time, however, it had something a cut above normal—the excellent pictures of Toby Alvis' ditching. I searched in vain for the photo credits. Who do we thank for this unique bit of on-the-spot photography?

Also, while I have your attention, I wish to commend you for your articles on women in aviation, particularly Blanche Noyes. "Alice in Neanderthal Land" and "Angels of Mercy" were the most recent examples of your positive attitude.

Richard S. Russell
Madison, Wi.

It's nice to know we are appreciated. The photos in the ditching article were taken by a crewmember of the rescue ship. Because we obtained them through a third party, his name was never learned, but whoever he is, it was a fine job.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Terrain Flying Handbook

In your reply to the query about publishing the terrain flying articles as a single handbook, you stated the FAA was not in a position to publish such a booklet. Why not reprint "Terrain Flying," which was originally published in 1960? This little book contained chapters on all sections of the U.S. and tips on the hazards to flying in each.

As the geological clock ticks, 20 years is a mere moment. How about it?

William D. Ruttan
Hollywood, CA

The Advisory Circular, "Terrain Flying," was discontinued several years ago for lack of public demand. It may be revised and reissued.

• A Gyro-Stabilized What?

The way in which you presented the two sketches in the "Pilotage" article (September/October 1979) suggests that the crosscountry traveller who engaged in aerobatics while consulting your articles would welcome some help in keeping his charts oriented. I propose development of a gyro-stabilized chart table mounted vertically on the instrument panel to keep terrain and chart coordinated for upsidedown flying. This should help reduce the number of pilots that get lost in marginal VFR.

Heiner M. Seidel
Germany

Let us know how it turns out.

• Mis-used Frequency

If the assigned frequencies for uncontrolled airports are 122.7, 122.8, and 123.0, why do some airports with a ground station use 122.9? In particular, one airport I am familiar with is listed on the section chart for 122.8 but most pilots there use 122.9 and make a mess of air-to-air communications.

Also, what frquency should be used for "chase" vehicles for sailplanes or balloons?

David M. Sgriccia
Walled Lake, MI

Possibly pilots at that airport use 122.9 because 122.8 is so crowded. Using 122.9 for air-to-ground communications is in violation of FCC regulations and could cost the airport their FCC license. The sole legal use of 122.9 is for air-to-air communication.

The same frequencies apply to sailplanes and balloons, which are aircraft, if operations are conducted at uncontrolled airports. Air-to-ground frequencies are for communications with a ground station or vehicle, and air-to-air frequency for communication between aircraft.

INSTRUMENT CORNER

• Visibility and Contact Approach

Can a controller accept the pilot's assessment of the ground visibility when granting approval for a contact approach at airports without a weather reporting facility?

Thomas E. Miller
Ballston Spa, NY

Negative. Unless an accredited weather observer has reported the ground visibility as one mile, the controller cannot issue the clearance. Since the pilot is not usually an accredited weather observer, his estimate of ground visibility would not be enough to satisfy the requirements.